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ABSTRACT

This volume contains 22 presentations delivered at the 1999 Intelevent Conference held in Edinburgh, Scotland. The proceedings were compiled, printed and distributed by the ERIC Clearinghouse on Educational Management at the University of Oregon. Papers delivered at the conference include the following: the inevitable globalization of communication; the need for the communication industry to become more and more focused on individual customers; rapid growth of wireless penetration in Europe; customer needs dictating the services that need to be provided; the move of broadband from the enterprise to the home; differences between fiber and broadband wireless; attempts to make the United Kingdom the best place to trade electronically by the year 2002; the "dark side of globalization"; the "Information Revolution"; telecommunication in the United Kingdom; Internet e-commerce; and networks of the future. (DFR)

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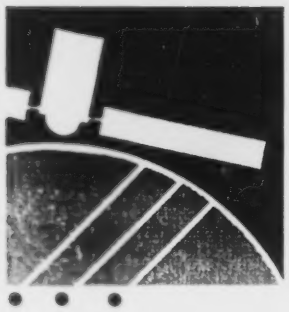

# INTELEVENT 99

## "TELECOM NETWORKS IN THE NEW MILLENNIUM: IS GLOBAL SERVICE PROVISIONING INEVITABLE?"

**12-15 SEPTEMBER 1999**

**EDINBURGH, SCOTLAND**

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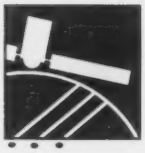
# INTELEVENT 99



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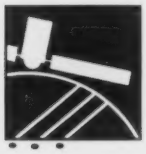

## PREFACE

This volume contains twenty-two presentations delivered at the 1999 Intelevent Conference titled "Telecom Networks in the New Millennium: Is Global Service Provisioning Inevitable?" The conference was held in Edinburgh, Scotland, September 12-15, 1999. Seventeen of the presentations in this volume were transcribed from audio tapes recorded at the conference. (The transcribed presentations are identified with an asterisk in the table of contents.) I made every effort to transcribe the tapes accurately and completely. In a few cases, I was unable to understand the word or words spoken by the speaker and so indicated in the transcribed manuscript. While I went to great lengths to correctly spell the names of individuals and organizations named in the presentations, in a few cases I had to guess at the spelling. The transcribed presentations received minor copy editing , e.g., correcting errors in agreement and syntax.

These proceedings are compiled, printed, and distributed by the ERIC Clearinghouse on Educational Management at the University of Oregon. Established in 1966, the Educational Resources Information Center (ERIC) is the world's largest and most frequently used educational information system. The ERIC database can be accessed online, on CD-ROM, and through print and microfiche indexes worldwide.

The University of Oregon was a co-sponsor of Intelevent 99. For more information about the University of Oregon's internationally recognized science, technology, and management programs, its externally delivered Applied Information Management Master's Degree Program for midcareer professionals in high tech organizations, or the Riverfront Research Park, jointly developed with the City of Eugene, please write or call John T. Moseley, Vice President for Academic Affairs and Provost, 1258 University of Oregon, Eugene, Oregon 97403-1258. Telephone (541) 346-3186. Fax (541) 346-2023.

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Philip K. Piele
Professor

# INTELEVENT 99

## DAY ONE (MORNING): SEPTEMBER 13

## KEYNOTE PRESENTATION

## SIR IAIN VALANCE

## Sir Iain Valance, Chairman, British Telecom, United Kingdom

Thanks Ron and good morning ladies and gentlemen. Had I known that this event was going to place in this room I am not sure I would have turned up, because the last time I had an event in this room where I had to speak was the time of the BT II flirtation, the second tranche* of the privatization of BT, and I was sitting in this room looking at a screen which was linked-up to Chancellor of the Exchequer of the UK in London and there was a link up to Wall Street, both vision and sound. I was meant to give a presentation from here. And just as the countdown for the presentation came about the screen went blank and all the sound went off. What had happened was that there was a cleaner out in the hall who severed one of the cables. But by a little bit of luck actually outgoing sound and vision was all right, so I got keyed down on a cellular phone and just about made it. But it does make me nervous.

But seriously, I am delighted to be here in Edinburgh and particularly delighted that BT is helping to make this event possible. Since its inception in 1981, this annual Intelevent conference has been an invaluable form for debating those issues that preoccupy all of us in the communications business. And precisely because events like these give us a chance to slip the constraints of our day jobs, they offer an ideal opportunity to take a longer perspective and perhaps a more protracted look at the future than business as usual permits.

[*Tranche is a French word meaning slice.]

This year your theme is exemplary in its millenniumis: "Telecom Networks in the New Millennium: Is Global Service Provisioning Inevitable? Perhaps first a couple of words of caution and both of them courtesy of Bill Gates in his new book Business as the Speed of Thought. Bill claims the business will change more in the next ten years than it has in the last fifty. Sounds reasonable on the face of it. But then it takes a moment or two to realize just what an astounding claim that is. Just think what it means. Think what business life was life on both sides of the Atlantic in 1949. The Second World War had been over for just a few years. Men went to work in their [unidentified: sounds like "D Mob"] suits; Smoked pipes in meetings. And perhaps the most complicated piece of office machinery was an adding machine. In short the business world of fifty years ago seems almost impossibly remote and Heath Robinsonish. And yet bill thinks that by 2010 today's business world is going to look at least as antiquated. The second

point he makes is that we tend to overestimate the amount of change we will see in the next two years and underestimate the amount of change in the next ten. Why am I telling you this? Not just a as plug for Bill. Well in effect both notes of caution combine to suggest that whatever we think the future is going to look like and whether or not you feel Bill is falling victim to the industry hype, it might be as well to use the word inevitable with a lot of care. And that's true even when the proposition in this case that the demand for global services is going to keep on growing seems self-evidently correct. The deeper truth is that is this industry just about anything can happen, happen quicker than you think, or perhaps not happen at all.

Let's take a step back and look at what's driving the apparently inexorable globalization of service provision. Suppose for the sake of argument there are four powerful forces at work in the communications industry.

The first of these has to do with the irresistible rise of customer demand. Major corporations are increasingly looking for global communications to support global brands. Small and medium enterprises and the increasing number of people working from home want a piece of the action that was the exclusive preserve of the multi- and trans-nationals. They want a shop window that is visible around the world. They want to win customers around the world. And at the level of the individual too the world is a shrinking place. Individuals are traveling more and communicating more. Customers of all kinds are getting more demanding and more discriminating. They want solutions; they want relationships. They want added value. They want the things they've always wanted: rewarding lives at home and at work. What they don't want is technology. What they don't want is products.

The second force for change is convergence and consolidation. The seismic meeting of once distance industries: computing, telecommunications, broadcasting, publishing, consumer electronics, and entertainment. These forces are generating a frenzy of activity: mergers and acquisitions, partnerships—a headlong dash from one market to another. The industrial and regulatory landscapes are shifting and changing by the moment.

And then there's the third force: the liberalization impulse that is putting a girdle around the earth. Markets almost everywhere are opening up to competition: the US local market, mainland Europe, most of the Asia/Pacific, Latin America. In 1996 the global communications market

was worth around 600 billion dollars a year, of which only around 180 billion, less than a third, was in open markets. By 2001 can be expected to have grown to over 1000 billion, a trillion dollars, of which ninety percent will be open to competition.

And forth there is the apparently irrepressible and accelerating development of information and communications technology—a technology that simply doesn't recognize national or political boundaries. The message that this technology brings is that everyone can be and will be in everyone else's back yard. And in a way that is what the Internet is all about.

To these four factors, we should perhaps add a fifth that affects all industries—and that is the growth and spread of wealth. More countries in the world are becoming wealthier, in part because communications enables them to expand their economic activity and in part because previously restrictive régimes are allowing more free enterprise.

This much you will know and this much is fairly uncontentious. But perhaps I could offer a few passing comments on this comfortable consensus. The first is to question what global really means in this context. Those of us who believe that information and communications technology is on the side of the angles are intuitively comfortable with the concept of a wired world. But when we say that we are in a global business, do we really mean it? Or do we mean we are in a business that spans a patchwork of the planet: North American, Western Europe, part of Latin America, Japan, Singapore, [and] Korea. And are we really thinking about a world of white-collar markets or workers—a global village or a global middle class suburb. The United Nations has recently produced a human development report on the emergence of a new underclass: those who for whatever reasons are denied access to what one might call the global conversation. The figures make dismal reading. In the West, a PC costs about a month's wages. In Bangladesh, it's the equivalent to eight years of average income. Even the developed world, income appears to be the determining factor. So in the US you are about twenty times more likely to have Internet access if you earn more than $75,000 than if you don't. Then half the world has never actually made a phone call. So is ICT a new force for inequality and does it matter? After all, we're business people—we're not the UN, we're not the World Bank, and we're not in the aid business. The answer is that is does matter and not just because we share the planet. It matters precisely because we're in business and that means we're in the business of creating markets where

they didn't previously exist. Historically the economic fate of much of the developing world has been determined at least in part by location, by climate, and by access to physical markets. Geography is and has been destiny. And David Land says in the Wealth and Poverty of Nations: "The world has never been a level playing field." Today's question is how far can we substantiate the claim that ICT makes history of geography. Can we really overcome issues of topographical destiny? I believe the answer is yes. For sure, the uneven take up of ICT is a reflection of existing inequalities. But ICT can also be part of the solution. Witness the emerging markets of Asia where the deployment of mobile communications is obviating the need for infrastructure investment at prohibitive Western levels—leapfrogging, if you like, fixed lines and going straight for the wireless world. And the more that television can be brought into play, the better, since even the developing world TV sets have penetration figures that are still a dream of the PC industry. Witness India, the new home of software development. BT, for example, has installed several high-speed data links between India and the UK, not just for our own purposes, but to cater the fast growing traffic between UK customers and their software suppliers in the new Indian software park. A parallel example closer to home here in the UK would be the South Wales virtual business community, which was set up with a mixture of European Union and BT money to help bring an area once associated with old metal bashing industries into the virtual world. There seems little doubt that the new technologies can bring work to people rather than people to work.

The other passing comment I'd offer on what's going on is that as customer demand globalizes and as companies globalize, so they get bigger. And we never seem quite to shake of the suspicion that size is a disadvantage. But big isn't always lumbering and small can be stupid. I spoke earlier of convergence and consolidation, of the global joining of forces and jockeying for position. And there are some big beasts out there, not the least of which will be the AT&T and BT global venture. But think it's a new kind of bigness. Global doesn't necessary mean uniform. Global doesn't mean imperialistic. It can mean and should mean multi-local. And the trick is to balance global coverage with national, regional, and local look and feel. And that's why partnerships of one kind or another are such an important part of the new industrial landscape. Partnerships are particularly critical and the points at which industries meet: publishing, entertainment, computing, telecommunications; at which technologies meet: copper wires and optical electronics, voice communications and digital TV; and at which

cultures meet: language, established markets, political clout, cultural nuance, and so on. The BT and AT&T global venture will operate under a genuinely global brand and will offer its will offer its multinational customers genuinely global products. But at the same time we're determined it will be local at the point customer contact: speaking with a local accent and doing things in a local way.

But just as some of the key players in our business are very big, other powerful key players a very small. And I am equally convinced that partnerships between larger and smaller companies are going to become increasingly important determinants of success. Small companies where a great deal of innovation is going to come from. And the thing about small companies is that they fit neatly into niches where large companies less comfortable and have legroom. And nowhere is there more apparent than in IP space, a space that sometimes seems to consist of nothing but wrinkles and niches. The world of the Internet is a spawning ground for what have become known in the trade as the two comma guys—those who've made their first million dollars on the net, often by the time they graduate from college. They've got very good at spotting niches and moving into them very quickly. They may not own a suit, but they know about the importance of meeting customer needs. They know about the importance N degrees of customization and personalization. They know that the Internet extends the real economically viable. And those of us who have been the business for some time would do well to be wary, because the future looks increasingly to belong to the young and of the agile. And if we can't get through the small spaces they can, we have to get them on our side. One of the ways in which big business can work with smaller ones is to provide funding. And if Silicon Valley is currently awash with venture capital, then this is not the case everywhere. There are currently far more two- or indeed three-comma guys on the US side the of the Atlantic than there are on this one. And that's not just because a million pounds is harder to come by than a million dollars. One of the reasons has been the shortage of venture capital. This is changing. And the big players have a potential role to play in this area. Indeed one part of our global alliance with AT&T will be a venture capital business. There's a double-head management challenge in all this, particularly for those companies from a traditional telecommunications stable. We have to learn to contest the market with competitors we simply didn't know existed a week or so ago--and in market sectors which have lost much of their familiar shape and predictability. And we have to ensure that our organizations are sufficiently attractive to the two-comma guys and to

their close relatives, the knowledge workers, who wouldn't normally find large organizations particularly attractive to work in. How one goes about doing that is the matter for another speech, but it has to do with company leadership and company culture--and as always the imponderables are critical.

I hope you don't feel I've strayed too far from the conference topic. What after all are titles for if not to be strayed from. But it is time for a conclusion, so here it comes.

Nothing is inevitable, least of all in our business. But in my view the globalization of communications does look set to continue. That said the air is thick with paradoxes. As it gets larger and more global, so the communications industry needs to become more and more focused on individual customers particular needs and more and more attentive to local delivery requirements. The more global you are, the more niches you have to find some way into. The USP of a global communications company is that it can be the same everywhere around the world; it can be the same, but different. The emphasis on the personalization of offerings and user involvement in the specification process will stop only when we reach the point of mass customization for markets of one.

It's going to be tough and challenging, but it won't be dull. So I really hope you enjoy the next couple of days. Thank you very much.

## Sir Iain Valance, Chairman, British Telecom, United Kingdom

Thanks Ron and good morning ladies and gentlemen. Had I known that this event was going to place in this room I am not sure I would have turned up, because the last time I had an event in this room where I had to speak was the time of the BT II flirtation, the second tranche* of the privatization of BT, and I was sitting in this room looking at a screen which was linked-up to Chancellor of the Exchequer of the UK in London and there was a link up to Wall Street, both vision and sound. I was meant to give a presentation from here. And just as the countdown for the presentation came about the screen went blank and all the sound went off. What had happened was that there was a cleaner out in the hall who severed one of the cables. But by a little bit of luck actually outgoing sound and vision was all right, so I got keyed down on a cellular phone and just about made it. But it does make me nervous.

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## DAY ONE (MORNING): SEPTEMBER 13

## SESSION I

## "Diverse Systems and Service Offerings"

**Presenters:**

**Daniel C. Petri**
**Pearse Flynn**
**William J. Rouhana, Jr.**
**Marten Pieters**

## Dan Petri, President, Bell Atlantic International, USA

Thanks, Michael. It's great to be back here at Intelevent because I know many of you share my view that Intelevent stands alone as the one industry conference that really works hard to create the kind of provocative discussions that we need to have in this fast-moving industry and helps to get our creative juices flowing every time we get together. I think Ron and Bob and Michael deserve a tremendous amount of credit especially for the progress that's been made in that regard over the last few years.

For my part, the role that I see for myself here is to be very clear on highlighting my views on the subjects before us and I will do my best to do that, so that you'll know exactly where I stand and so that my three friends over here know where I stand on things to enable us to get a discussion started. So as Michael said, the subject that we're starting out with is diverse systems and service offerings—or really more to the point: Is a wireless system inevitable and how does that affect the wire line system that exists. I'll start to tip by hand right up front by saying that it depends—it depends on whether you're talking about wireless as ultimately replacing wire line strictly in the context of services that are available today or do we foresee some change, some shift in the industry that makes the traffic that we carry on those two technologies somewhat different than we've seen over the last few years.

So let's begin by looking at where is wireless today. It was a little less than twenty years ago that some experts at AT&T predicted that by the year 2000, just a few months from now, there would be about one million wireless customers in the US. For that prediction to be true, we would have to lose about 49 million customers, because there are 50 million wireless customers today in the US and about 200 million worldwide. So, you could certainly say that that the wireless system has already arrived front and center: It's a full player in our industry. PRIMCO, which is the US provider of PCS services in which Bell Atlantic is an investor, recently commissioned a US survey to explore the wireless communications habits of customers who use the service. (I'm not sure of the cost of the survey.) They found (amazingly) that wireless is everywhere. Then they said a few things to justify the cost of this survey. They said ubiquity of the wireless phone is rewriting the rules about when we talk, where we talk, and what we walk about. And I would add to that how we communicate as well. According to

the survey, almost of a quarter of America's wireless users already consider their wireless phones to be their everyday phones. They're using their wireless communications more frequently and as their lifeline. What's hidden under that statement is the fact that there also seems to be somewhat of a generational difference. My twenty-one year old daughter, for example, who has both wire line and wireless service, has virtually abandoned the use of wire line communications. She's on the wireless on the phone all the time. When she turns it off, it goes to voice mail; then within a few minutes, she checks her voice mail. So if any thing this wave of change that we've already started to see I believe is about to accelerate, because the younger generation even more comfortable with mobile communications than some of us are.

The survey also said that twenty percent of the people who are using wireless phones are ready to throw away their wire line phones. So there's the first sign, in this survey at least, that there's a potential danger, we might think, to the existing wire line network. I'll come back to that.
Now it's important to note also that this survey took place in the US. The US is not a leader in penetration of wireless phones. If anything, the US lags more advanced countries by quite a wide margin. For example, there are cellular phones in Italy today than there are wire line phones. Finland also can make that same claim. Now in Italy, where cellular phones have about a thirty-six percent penetration of the population, they rank sixth in the world in terms of wireless penetration; the United States ranks eighteenth. We are making all these comments based on a US survey about where wireless stands and we find elsewhere is the developed world countries are even more advanced with respect to wireless than is the US.

Without much provocation, I think we can agree that there is a least one seismic change: a lifestyle change that's underway in the world and wireless is at the core of that seismic change. Why? People prefer the freedom, the convenience, the mobility, and the security that wireless communications adds to our personal lives as well as our professional lives. As these networks continue to grow to meet more kinds of demand they will offer more powerful services and increasingly competitive pricing. The US market, which already has a well-developed wire line business with fairly high levels of service and low prices, will continue to behind the rest of the developed world in terms of the growth of wireless. It might take several years for a really strong replacement of wire line with wireless service to take place. But that change will come. At the same time, that timeline will

be even faster in some of the these other areas I've mentioned already where land line service might be somewhat less competitive and service might not be as good, so it's easier for people as they begin to enjoy some of the economic growth Sir Ian spoke about find wireless service more accessible to them. We see it happening today, for example, in Europe I think one of the big causes of growth in wireless services is "calling party pays." We don't have that in the US. It encourages wireless users to leave their phones on let people call them and then, of course, it generates more calls going back in the other direction: that's one mechanism in Europe that I believe has helped the growth of wireless and I would love to see it in the US as well.

Another improvement that exists in Europe that doesn't exit in the US is the existence of a single technology. So I believe we will continue to see rapid growth in wireless penetration in Europe and in Asia as well for same reasons. The US will lag, but will continue to grow and overall we'll see the same direction.

Let's stop a minute and see what I seem to be saying. I seem to be making a case for the ultimate replacement of wire line with wireless service. The question then is wireless a threat to wire line? I'm happy to say that we [Bell Atlantic] see in terms of a short answer the answer is no. Because we see market expansion that's happening through three areas of development that one cannot capture just by taking a snapshot of what's going on today.

Certainly voice traffic is migrating from the wire line to the wireless network. There's no doubt about that. We view this as positive, however, because at the same time we are seeing data services starting to take over voice as the primary service on the wire line network. The confluence of these developments—movement of voice to wireless and data to wire line—is leading to a functional integration of IP-based wired and wireless networks. Thus, we are starting to see this convergence. (Sir Iain touched on that as well.) For many of our customers using their cellular phones for a greater percentage of voice communication is a natural evolution. The technology and the quality of service are getting closer to that of land line so it's a natural evolution. We [Bell Atlantic] expect that by 2008, less than ten years from now, US wireless penetration will grow from twenty-five percent today to about sixty percent. And during that same period the percentage of telecom minutes on wireless is expected to grow from five percent to twenty-one percent. The share of revenues will grow from fifteen percent

today to twenty-eight percent in the US. We expect even higher results in international markets.

Let's summarize the first point here. I want to make sure I'm clear on my opinions, so when I come to one I'll find a way to let you know. This is my first opinion of the day: If we were living in a voice only world, in other words if communications could go back five or six years to a point in time when we were primarily looking at voice only communications, then wireless would almost certainly replace wire line—and for all the reasons that we're familiar with and that I just mentioned earlier. That would be a disruptive technological event that would pose a significant threat to Bell Atlantic's wire line network and BT's wire line network and few others that are represented in this room. But there is good news behind all this and I've been hinting at it for the last few minutes. The world can have more than one seismic change at the same time. Data is taking over the wire line network. It's cannibalizing the voice network; its starting to fill in very aggressively the spare capacity that is being freed-up as voice traffic moves over to wireless. In some areas it is doing it at a faster pace than the pace at which wireless in displacing wire line for voice use. We've had incidences in New York where we've had to significantly alter the configuration of central offices to deal with higher holding times of data traffic as opposed to voice traffic. It's causing a significant mix in the traditional traffic engineering elements that our engineers have to look at. In fact, we expect that by 2003 ninety-five percent of traffic will be data and only five percent voice. So let's see what that means in terms of the messages that we're getting from all this. We see ourselves evolving toward a world of interconnected, IP-based, wired and wireless networks (convergence) feeding data to millions of electronic devices: telephones, PCs, pagers, cell phones, and probably a host of appliances that at least I haven't been able to think of yet. The difference between network function, which we so clear today as between wireless and wire line, will dissipate. The question to a potential customer and equipment providers and to those of us in the industry will not be which is the right phone to use, but rather is the network optimized so that a customer can get the services her or she needs on the basis of whatever best serves that particular need. That's where we start to think about the services available today—there will be more out there. Now companies like Bell Atlantic and BT and many of the others represented in the room are beginning I think to realize that one has to provide a variety of networks to meet these services, because it isn't safe in this industry to be positioned to provide just one kind of service, for example, just wireless.

And so, we believe integrated, not bundled solutions, are the key to serving customers. For now at least we think we've got it figured out. We're position ourselves to capture both in the voice side—moving toward wireless—and on the data side—moving toward wire line, creating shareholder value in an industry that has been transformed relatively quickly, although not as quickly as the changes we are about to see going forward. This is caused by three things: the globalization of the market place, which is driven by what I think is the most important development to hit our industry in one hundred years and that's the Internet; the emergence of wireless services as a mainstream lifestyle product for people; and the creation of new cost and revenue models caused by advancing digital technologies. And so, we believe that to be successful the definition of full service provider is going to take on three components: local broadband, global data, and global wireless.

Let's take a look at just one of those: broadband. Today only about five percent of on-line users have access to broadband. This is one of those products that provide a benefit to the provider—Bell Atlantic in my case—as well as to the customer. We're finding that customers who have access to broadband and who use the service spend about twenty-two hours a week on-line, whereas they only spent about five hours per week if they don't have that kind of service. We also find that once they get broadband access, they move their PCs out of their dens, which implies that's it's a place where you go for that particular purpose, and they move it into places where they are doing things simultaneously, like a kitchen. This showed up on that survey as well. There's a migration of how people use the service once they have instant on capabilities that comes with broadband.

Three attributes come with broadband service: capacity, speed, and always on. And those are the things that are driving changes which people are using access as the result of having broadband access. In fact, Bell Atlantic's chairman and CEO, Ivan Sidenburg, recently told a similar gathering that this kind of revolution in the technology and how people use it will require a next generation Internet network, one that's affordable, always on, and can handle this convergence of voice, data, and video streams and deliver all of this to consumers in every household. The market wants better connectivity. So the trend in the industry is not just wireless or just voice or just data; it's putting all these pieces together. As a result of that I believe a successful service provider will address the market place with the industry's best wireless and wire line networks and lead the industry in developing and

deploying new technology platforms. Bell Atlantic in this coming year [2000] will invest about eight billion dollars in our two types of networks: wire line and wireless. On the wire line side, we're moving quickly into IP-based digital technologies, which we think will meet the needs of density, capacity, and flexibility. On the residential or consumer side, this [service] is primarily in DSL. We'll have about ten million households accessible to DSL by the first of quarter of next year, and about twice that many—twenty million—by the following year [2001]. We are making a real commitment to broadband access to bring about those lifestyle changes that I mentioned earlier.

On the wireless side, not surprisingly, [we're] spending about a billion dollars to convert to digital. So there's an effort to bring a bit of the technologies together and to move to the next generation of digital network, which is the so-called 3G that makes wireless another broadband alternative to customers. There's the beginning of the next wave. We'll be here a year or two years from now in this conference debating of the migration of data to wireless. I'm not sure I know where that takes us yet, but I think that's the beginning of the next wave of this kind of a transition. So the mechanism here for a successful full-service provider is to find ways to invest, to take advantage of what we believe is the interest of customers.

And that leads to my third opinion: the belief that customers only care about access, whether it's access to their voice needs, their data needs, or the combination of those two things and that it has to come in whatever form is most convenient to them. The days of selling a technology are over. The days of telcos developing a field of dreams strategy—build it and they will come—those days are over too. The customers, based on their needs, are going to dictate the services we need to provide and we need to learn how to provide them in a converged way so that the customers can take advantage of what we have to offer.

This summarizes the access story.

Now, under the heading: "Does the customer care about the technology? No. They care about other things." That's creates a series of market dynamics that for companies like Bell Atlantic represent something relatively new and potentially frightening. And that is we're facing increased competition, declining prices, and increased pressure on margins. Contrast that with our incumbent monopoly status a number of years ago

and you begin to see that we need to change how we're doing business to meet these needs. What we've done to help us do that is the following: Forget about technology; forget about telling customers this is what you need: buy it. Instead focus on what customers want given the broader array of choices that they have today. We focus on superior network quality, meaning digital coverage in the case of wireless; high reliability, ubiquity in scale and scope; the value proposition, which is the overall packaging, the pricing of services; and product innovation in a way that makes customers want to stay with us because they have multiple choices; world class customer service, that means a skilled workforce that's able to take care of questions of the first call with a market focus and understanding what customer needs are; and providing direct access to customers that find those customers where they work, where they shop, and simply being a demand order taking operation as we were in the past. Forgetting, at least a the customer-facing edge what the technology is because that doesn't really matter to the customer. It's this combination of developments, offerings that make sense to customer. And these are the factors that are more important than the technology that's being used and will enable us to be successful in this new environment. In fact, we have a definition of market leadership here, which has now three components. High-speed connectivity to the mass market. This is taking advantage of the dot com economy: e-commerce—something that's probably growing by a factor of five to ten over the next three years—we need to be at the core of that Internet economy as we extend digital high-speed capabilities to consumer market, as I described earlier. At the same time, high-speed data connectivity to business customers and that means taking them where they want to go whether it's locally, domestically, or globally. And doing it in a way that meets their local needs that gives them access to the entire world. As we achieve regulatory relief and are able to actually put together the networks that allow us to provide our customers international connectivity is high on our radar screen of things that are important to us for both the wireless and wire line technologies.
And finally, build a global wireless franchise. The migration of voice minutes to wireless networks that we've been talking about: let that accelerate, participate in that acceleration by offering the kind services and the full coverage that our customers need.

I hope that over the next couple of days during this conference we'll be able to provide more information, maybe a status on, Bell Atlantic's discussion with Vodafone regarding exactly that idea in the US, which is founded on the need to provide a more robust coverage in domestic US wireless market.

We don't see wireless as a replacement for wire line, but as part of the natural evolution of service that are driven by customer needs--not by simply the existence of a new technology that some engineer wants to build and some sales person has to figure out how to sell. What we see here is not a contest between wireless and wire line, not a contest between one technology and another, but rather something that is coming together in a nicely symmetrical way and that is also, in our opinion, inevitable.

That's my position on the subject so far. I look forward to our discussion. Thank you.

## Pearce Flynn, Executive Vice President and General Manager, Europe, Middle East, and Europe, Newbridge Networks Limited, United Kingdom

Broadband is moving from the enterprise to the home. The danger with a lot of telcos is they're viewing broadband as high-speed Internet access. You are going to invest a lot on high-speed Internet access. In my view, you may be chasing a parked car, because you are going to give yourself a solution which is going to last you for a year. But I can tell you we [Newbridge] are out talking to companies. We're talking to Time-Warner; we're talking to Disney; we're talking to Yahoo; we're talking to America Online. So we're talking to different companies than our traditional customer base that was telcos. So if you look at the competitive landscape here, you've got the incumbent carriers, who have the access via copper; we've got the alternate carriers with the unbundled local loop; and we've got cable companies. Now cable companies are causing significant inroads into the market here. There view is that they are not only going to offer high-speed Internet access, they are going to offer telephone services. In fact, they make it contingent—the only reason you can get TV services is if you buy telephone services. We've seen the surveys where the cable companies are pulling huge amounts of customers away from the traditional telcos. We've got the next generation satellite systems. We may all have our own personal view of whether that's succeeded or not. I would encourage you to look at a new type competitor: the aggregator--the ISPs, the Yahoos, the American Onlines. These people are taking a very, very forward view on this.

What are they all fighting for? They're fighting for the telephone, the computer, and the television. If you listen to Sir Iain Valance's speech this morning, he said a fraction of the people in the underdeveloped world haven't even got telephones. The television is far more prevalent in the world than, in some cases, the telephone. Everybody is fighting for this area. Now, the types of people we're talking about have very, very large pockets. You're talking about Bill Gates, already mentioned this morning. You're talking about Rupert Murdock. You're talking about traditional companies that are very rich and very large organizations in their own right. This is the competitive landscape. As I go through my presentation, I will explain why it's becoming so important.
[Next video image]

Convergence. It was mentioned maybe ten times already this morning. Really we [Newbridge] see this happening. The voice, TV, and the Web [are] coming together, forming a new area which is in the center—the full service provider. Somebody talked this morning about the full service provider. The full service provider is somebody who can provide this. What I want tell this morning is this is available now. I loved the comment this morning from Sir Iain Valance, which as basically saying that big doesn't mean bad and small doesn't mean bad. I agree with that. The reality is that it isn't the big guys that meet the small guys, it's the fast guys beat the slow guys. We're dealing with customers today, where I have to say they tend to be smaller in nature, are taking a broader view of this, than other companies are taking. It's almost like they've got a rule book out and they are going: Step one says we provide this service, then two years later, step two says we do this; and then two years later, says you're going to get murdered. Because there are companies out there today that are going to launch these three things [voice, TV, Web]. The cable companies are already virtually there. Although some of the technology doesn't quite work and some of them are going to have to make some major investments in their own infrastructure. But there's companies today that are going to launch these services. I'd say if you're going into broadband access by rulebook, you're going to get—to use a term in Britain—[unidentified word: sounds like "guzumpted."] **********

[Next video image]

We're calling it 3DSL. What I mean by this is we see a lot of people with just plan high-speed Internet access. I agree with Dan's point that high-speed Internet access is the first thing that's driving … our surveys back up Dan's point. If you give a person high-speed Internet access, they're online more. They're on for magnitudes…four or five times more by giving them high-speed Internet access. Dan was talking about some services that may be revolutionary for Bell Atlantic, but I can tell you there are small companies delivery those services today. Always on: It's amazing that we would expect a guy to sit there-- phone ringing, the postmortem—and suddenly you come back and its like always on, you pay for it as you use it. It's like the water, you turn it on—it's there when you expect it. So it's like the dial tone. There's a huge demand there. So 3DSL, which for us, is the coming together of the voice, the data, and the video to give us this new [unintelligible word]. This is available.

[Next video image.]

I want to transport you into the living room. Now the danger is people say this is the living room of the future. I can take you to some places in the

world were this is available today. Do you know how we [Newbridge] demonstrate it to customers? We take them to a customer's house. Sit in front of the TV. Sit in the big couch. And you are going to look at this.

Now let's come into an executive briefing center: smoked mirrors, lights, all sorts of things and then we'll demonstrate it to you. It's not. It's not. So I'd like to take you into some of this and then I'd like to, if you'd allow me, to show you were some of the other people getting excited about this, not just traditional telcos. So if you look at this [video image] you are going to have on the TV screen the TV, films, the phone, the Web.
[Next video image]
You select the film. Nobody today has got it on demand. This comes and its available. What happens to Blockbusters? Because when Time-Warner see this and when Disney see this, their excited because … you're now in the home. You've now got the level of convenience that you don't even have to get into your car and go to the stores. And it doesn't mean as it is today with the cable companies that you have six videos that are recycled every hour or every two hours. This is where Time-Warner …. We actually demonstrated this technology in Hollywood and we had phenomenal response from a different set to people who we would be ashamed to talk to before.
[Next video image]
TV. I would threaten that the NBCs and the BBCs of the world—going forward—are in trouble, because you will decide your own television station. You'll say: I like Seinfeld. I like Friends. I like Coronation Street. And by the way, I've been on the road all week and I would just like to watch the five episodes that were on this week. And one of the good things the telcos have is that you have phenomenal customer databases. So if you look at the difference between Dan and I. Right, when I come on, because I'm Irish, they'll go "oh, he's watching a football match; hit him with a Guiness ad." Right, Dan's watching the New York Mets, they'll say "Hit him with a mineral water ad for Bud Light or something, right?" But what you have is tailored advertising, basically knowing what you have. Everybody is fighting for the eyeballs. This is where is the Yahoos … I mean in my own company we pay on the Alta Vista web site any time certain words are done, [our] advertising pops-up on the screen. But that's a fraction compared to TV. Also, when we talked to one company about this they said: Maybe we could go with a scale that—if you don't want any advertising, the cost of the move is trebles. If you are going to listen to a lot of advertising, they'll dramatically discount the cost of the movie. What I'm

trying to get across is different people who you normally compete with are looking at this technology.

The Web. This is something obviously that has already been very well exploited by the Yahoos, the America Onlines, in terms of all this, but again we would see that with the convergence of all of this onto one point.
[Next video image.]
With the traditional phone services, you can view your own phone bill. Some of the things you can't do just now and see the before you get the bill and see that your children have been phoning at pornography line or something rather than finding that out later on. **********
[Next video image.]
How are these services delivered? They're delivered through copper wire. So the services I talked to you [about] just now--those whole stream of services are available through copper wire. We're working with what I call "tiger companies" to go with this. As a company, we [Newbridge] don't have time to work the internal politics of companies that are taking two years to go and work this. You're going to see some big announcements coming out over the next two or three months. You're definitely going to see them at Telecom 99 from ourselves about companies that are going to be offering broadcast TV, video on demand, high-speed Internet access, and plain old telephone services.
[Next video image.]
The one slide for the "techies" in the audience; I'm sure you wouldn't be happy unless there's was a cloud of some sort here. What it really is very simple principle: multi-service, providing multiple services on that same investment. So you see here at the headend we've got broadcast TV, interactive TV, Internet—these a companies today—they happen to be affiliates of our own company that we are working with in delivery …. The whole business is about delivering services. As we as a company are facing a dilemma, which is do we go along and just talk about technology or do we go along and talk about services that you can deliver on that technology. Back to my point about getting away from the religious argument: I'm not interested in religious arguments. IP. Anybody who fights against that is wasting their time. Also, to come back on to a point [that] I think Dan alluded to it in his presentation. Eighty percent of the available bandwidth in the world is taken up by data. Nine percent of the revenue is coming from data. So, we better start selling service on it or we continue to go down. But eighty percent of the bandwidth is taken up by data and growing by the day, so that's good if you're selling routers. I don't know what else it's good for.

I think you need—your company that needs to differentiate. You're company needs to sell services that need to make on them. All I'm saying is that you have a new kind of competitor. And I would say—the only message I would like to leave you with is I think it's happening faster than we maybe think it is.
[Next video image.]
This technology is available and working now. And I'm given you all an open invitation to come to our stand at Telecom 99. Why hasn't this worked up to now? What's happened? Everybody has talked about voice. The only thing that has worked over IP is the Internet. Voice has not happened. Up to now it's not worked because we haven't been able to converge. So we've go the Web, which is driving phenomenal amount of traffic—which, by the way, I'd say is more of a hindrance to a lot of companies than it is a benefit at the moment unless we can turn it into services. Broadband IP really does allow you to get this convergence with the TV, voice, and the Web. And that's why we really see the future, we're really very, very excited about it.
[Next video image.]
The changing market: Is there a view for history here? If you listen to some of the—which I think is dangerous—we're saying, and I think everybody says, ok then I'm going to just be an Internet provider. I'm going to provide broadcast TV and I going to provide telephone services. The customer will go for convenience. ***** We're seeing the disappearance of the individual shops and the emergence the full service provider being the superstore. I'm sure we'll argue either way—which says that doesn't mean there isn't single shops, that doesn't mean there won't be niche players, but I think there will be dramatic room and huge growth for the companies that can bring all this together. Forget the technology, just provide these services to the customer. And by the way, you'll challenge other people's space—Blockbusters, all these people who currently—by the way they can see this as well, so this is a very threatening technology for everyone. So the full-service provider will win. It turns your copper into gold. And I apologize to some of the incumbent people here who own copper, but it does turn your copper into gold. The point is that this is going to roll out. You're going to see it very soon. We're very excited because it's available now and we're not talking about something that's "vaporware"—and well we see the industry going this way in two year's time. My message again that I would like to leave with you is you have different competitors to the one's you traditionally have and some of them just see things—I mean we were shocked. We went in with a view like this and they just came around and said "ah" we can look this like this, this provide—and you know the telcos, the traditional telcos

that own their own copper have a huge advantage in some of this area, provided they move fast or other people, I believe, will take the high ground and you will lose. I think [these] statistics in the UK alone, that the cable company is taking 10,000 customers a week. The cost of getting those customers back--and it's very, very difficult. ****** It's going to be about adding value and not just giving people British Airway air miles if they go and use your telephone services.

That's it for me. I just wanted to give you an overview of broadband access, so thank you very much. 3DSL. Thank you.

## William Rouhana, Chairman and CEO, WinStar Communications, U.S.A.

Thank you, Michael. I'm going to be talking to you about a form of wireless that is not the equivalent of mobile. There's been a lot of conversation about wireless this morning, but it's all been about mobile wireless. At WinStar what we're doing is leading the way in the creation of a fixed wireless network, which is broadband. We are, as Michael said, focused on the business community in bringing broadband services to that community first in the United States. Now broadband fixed wireless does what fiber optics does. So if you can transmit something using fiber optics, you can transmit it using broadband fixed wireless. Since I've learned in the conversations in between the meetings that most people have don't have any idea what we do, I'm going to spend a little extra time trying to describe what we do that I normally would in a speech like this.

What's we're doing is serving businesses. That's our focus and there are a couple of reasons for that. Primarily the reason is because there is an easier way to build a network to businesses. Eighty percent of businesses in the United States are in multiple tenant environments. That's were it is sensible economically to use broadband fixed wireless to bring services. Now incidentally as we build that network throughout the US—and in fact now around the world—we're getting line of sight from out network to multiple dwelling units, and about one third of Americans live in multiple dwelling units. That's going to be an important factor in terms of our ability to ultimately extent our network to the residential market. There's a hundred billion dollar market in the US alone that we talking about and addressing. The way we see the world—and I think this is probably something shared by most people today, but there's still some controversy in part of this—is there are only two ways to create a widely available broadband network. One, obviously, is to upgrade the copper that in the ground and we heard a little bit about how you can do that this morning. There clearly are lots of people trying to do that; there's lots of energy and effort going in to that. But the other way is to combine technologies, to combine alternative technologies including fiber and what we call wireless fiber to build a widely available network. That's where we're focused: It's on building an alternative network. Now the demand that we see for broadband and that we've all seen for broadband is quite clear. But why is it happening and what are we in the process of doing I think is sort of an interesting question.

Something happened here in the last couple of decades and we broke up computers and started to distribute computer power to people. First we pushed it right to the desktop as you all know. Pushing it to the desktop we created a need for computers to communication with one another. In fact, we created the ability with the push of a button to use more bandwidth than we used to use in an entire lifetime speaking on the phone. But also as time evolved, we started to locate information at a remote spot. It became known at the Internet. As we started to put power on our desktops and move information away from us, we created an even greater need for bandwidth. We had to connect to that information--to those information sources—and we had to connect to those computers. What we're adding [is] a third level to this right now as probably now as we develop these application service provider models. At least in the United States, we're starting to locate information in between the Internet and your desktop as we try to let small and medium companies in particular share access to the kind of information services that are usually only available to large companies. Now the combination of these three things are really about a very simple phenomenon. Really what's happening is we're turning the communications network into a big computer. We're turning it into a computer that spans the globe. What we're doing is taking the formation and we're putting it in the places that it makes the most logical sense for us to locate it, based on a combination of economics, functionality, and security—and a variety of other things. That's what's happening. That's really what's driving the way we're building a network and I think it's driving most of what we see around us.

Now we take an approach to that phenomenon that is based on three layers. At the bottom layer, we're building a broadband network that we own from end-to-end. We're building it as fast as we can and in as many places as we can. We own our own fiber backbone, we have fiber in the cities, and we have our local licenses—our wireless fiber licenses. On top of that network, what we're trying to do is build functionalities, to make that useful to our customers. That's everything from voice, which we view as just one more application on a broadband network, to things like web hosting and web design to Internet services, to application service provision. So we're trying to make this network as useful as possible to our customers. Then we see one more way that it has to be made useful and that's at the application layer itself. There we have [done] every thing from accessing other people's applications and integrating them into our network to building our own where it's appropriate. We recently launched something called

Office.com, where CBS is our partner, which is designed to be a broadband portal for small and medium businesses to use the Internet, to use it in their work to make the Internet useful to them. There is another company that's doing something similar, but for the residential marketplace. That's what AT&T has begun to do as they combined the cable assets with the at-home proprieties in Excite. Now in their case, there is a fair amount of controversy as they try to cut others off from the customer they service. Our approach is a little bit different. You can use other people's services if you use the WinStar network. We're not so arrogant to believe that we can cut people off. There is certainly value for our customers, we think, in using various services that we have together and we try to make sure that work together. The opportunity that we're talking about here [and] the things we're trying to address are really driven by one very simple fact: When you try to extend a broadband network into the local market, you're talking about creating a whole series of individual networks building by building. This is not a small task. In the sixty markets that we address in the US, there are seven hundred and fifty thousand commercial office buildings that have multiple tenant environments. Now that' an awful lot of buildings. What's interesting is only ten thousand of them have fiber optics in them. That's not very many. That's a disproportionate of the market. Because twenty percent of the market is in those buildings, they tend to be the biggest buildings. But that still leaves eighty percent of the multiple tenant buildings in our country, the US, without broadband access except through antiquated, rather old-fashioned copper networks. When you take a look at those seven hundred and fifty thousand buildings, what you'd see is a hundred and fifty thousand of those have about sixty percent of the market in them. That's were we're focused, getting those hundred and fifty thousand on net as soon as possible.

Fiber, which we all know makes a lot of sense on the backbone and is very cost-effective of go long distances—doesn't make a lot of sense in the local loop. It's too expense, too time-consuming to build, and, frankly, sometimes environmentally impossible to build to buildings. A typical fiber building in the US costs about four hundred thousand dollars to actually content to—and that doesn't matter whether you're a regional bell operating company or upstart or startup. As a consequence of that, over the last couple of years there's been a very quick drop-off in the number of newly fibered buildings in the US. What you can see in this chart is less than nine percent increase. What has happened is upstarts or startups, the folks to fight the incumbents, have taken to building into the incumbents' networks to actually connect to

their customers—that's called co-location. They build into central offices of the incumbent local exchange carriers and that how they connect to their customers. I, for one, don't think that makes a lot of sense strategically. You're basically committing your capital to become more dependant on your competitor. I think in the end that has to work against you. But that's the only alternative unless you've got a different way to connect, and fixed wireless, while it's a different way, is not available to everyone because you need licenses to do it—from the government.

Now I try to show here a picture of how we actually build these networks. A number of you asked me questions about this, so I'll take just a minute. We're look down on a city in this slide. As we look at this, what we'll do in a city is we'll go we'll identify the buildings that have good line of sight to the remaining buildings in a city. And usually between four and twelve depending on what the nature of the city is; in New York it takes us about eight or nine. We can get line-of-sight to eighty-five to ninety percent of the multiple tenant buildings that there are in that city. By establishing hub site on those buildings and bringing our fiber backbone to those buildings, we're able to provide a collection point for information and the telephone services that we provide from those hub sites. Off those hub sites, we use are fixed wireless either with point-to-point or point-to-multipoint to connect end user buildings. As compared to the four hundred thousand dollars that it takes to connect a building using fiber, we can bring DS 3 capacity to a building and up for under fifty thousand dollars. So the economics is very different and the speed, of course, is a lot quicker to use wireless than to dig up the streets. What we believe is the optimum in network technology is the combination of fiber and wireless fiber, so we've put together a national backbone of fiber that allows us to connect those wireless fiber links. This is another rendition of it. I think the key point to understand that the technology in broadband fixed wireless is now such that out of a single channel of 38 GHz, which is were we primarily operate, we can get 255 Mbps of speed. We have nineteen hundred MHz of spectrum in a place like New York City. That means we can bring 4.4 Gb to a building with today's technology. That's a lot of bandwidth to an individual building—and it's more than enough for today's demand, that's for sure.

This is quite scalable and easy to install. I think that's another key point. Just so you understand how this really works and why this is such a powerful economic model and why I believe this really is going to imitated all around the world: It takes us twenty voice-grade lines sold at fifty

"bucks" a month, which is not very much in our business; our average customer is sixty-five dollars a line and twenty-three line, to break even on extending our network to a building. That means that we're sitting in each of buildings with a bandwidth bank of six hundred and fifty lines of capacity—and that's all free to us. So the economics of this are very powerful, very scalable, and therefore very easy to imitate.

Now the difference between fiber and broadband wireless … I think it gets better and better all the time. This slide is really supposed to explain that. It really has to do with the nature of the capital that you must spend you must to build these two networks locally. If you think about it, there is no Moore's Law for people, and ninety percent of the cost of building a fiber network is about construction. Less than ten percent is for the glass and the optronics. It's all about digging—cracking the streets—digging them up and laying the glass in the ground. A wireless fiber network is almost the opposite: Eighty percent of the capital goes into equipment and what you see, if you take a quick look at the numbers, is over the last four years that capital cost per T-1 of capacity has come down from thirty-five hundred dollars to under one hundred. That drop in cost is just ongoing; its going very, very quickly. There are a couple of people in this audience who are helping us drive those costs even further. So this is a phenomenon that I don't think is going away. Now we're very focused as I think most people are on the fact that it's not the technology, it's the services that really matter. We've heard that this morning a couple of times, but, as some of my colleagues of said, it's very important to deliver services at a good cost. So the fact that you can build a network, make it widely available, you can do it in a timely way, and you can do it inexpensively, I think is an important factor and we can thank technology for that.

The speed at which technology moves obviously causes most of use to talk about technology rather than talk about the services that we render. But we're very focused on the fact that a useful network really does help us to share what we know and does empower us. In fact, the fact that the network is the computer is something we live by at WinStar.

I have a view of the world that says that the broadband revolution starts in the business place and moves to the home. I know that most people believe that broadband … is on a parallel path. I don't really believe that's true. I think there's some broadband applications that people are very used to at home—video and the like, but their getting those services and their getting

them most or less the way they would like them. There's not a crying demand for video-on-demand. There is certainly quite a few ways of getting video service today. My view is based on the fact that people change at a certain pace. No matter how fast technology changes, people change only at a certain speed. In business, there are a variety of things that cause people to adapt to new technologies. Of course, one is the need to be competitive. But there are some other things. For a guy like me, who doesn't really know how to run a computer, really is not technologically adroit, the fact there is somebody at the other end of my hall, who can come and fix my computer when it breaks, is a very important thing. It lets me have a support system to use new technology in a way that makes me more likely to try to do it. I think the evidence is out there that technology migrates from the business to the home. It's happened quite a few times.

The second thing that drives my point of view about this is simply the numbers. There are millions of residential little networks that have to be created to reach the home. There are still a lot to create for the business market place, but not same tens of millions. So I think it's more difficult to reach the residential market than it is to reach the business market.

There are a lot of companies attacking the issues that I'm talking about here—and they're being attacked from a variety of points of view. I've talked about a broad landscape: the network, enhanced services, and information. You can see that a variety of people are at it, and they are attacking it … through alliances and the like. I think as the result of that, especially in the business market, the reality is that it's going to come quickly. Now we've spent a lot of time and money building our network and [unintelligible] profitability. We do have very large bottom line numbers; they have brackets around them. So there not—I think we lose about a hundred and twenty million dollars a quarter now. Which is sort of a daunting number, a least when I get up in the morning. It costs us two million dollars to open up every day. It's a lot of money, but, in fact, I think we're building something of great value.

We have some very important strategic partnerships. There are some people from Lucent here; they're one of our key partners. Williams is another, and so is CBS. We think partnerships are a good way of going about building to this very, very diverse set of competencies that we need to have to met our customers' demands. We put together an incredible spectrum portfolio; because we were the first to ever think this super-high frequency had any

value. As a consequence, we have spectrum all throughout the United States and around the world that meets, I think, of where we're going. What we try to do is match our spectrum where there is use of the Internet today. I think Sir Ian had a very good point this morning about the fact that we're focused on the developed world. Well, we're a classic example of being focused on the developed world. Our strategy is to go to top 110 markets around the world. The reason for that is that's where the business is. It's why do they rob bank? Because that's were the money is. Well, we're going to the developed world because that's were our business is. Ninety-five percent of it is simply in these 110 markets; that's why we're focused there. Sixty of them happen to be in the US; fifty of them are in international. And you can see we are expanding our presence rather quickly; we just won some licenses in Germany.

There is some question I always here about: Does this stuff work? In case any of you are still wondering [about] that, I put up some reliability statistics, so everybody knows that broadband fixed wireless does work. It is available a little more often than fiber is—we don't get cut, so therefore you can't take it know hard. The customer trouble records are the best in the industry if you take a look at our actual experience. In New York, we are the second biggest network after Bell Atlantic, and we're twice the size of AT&T there. We are the number one performing network in terms of reliability every single month. This stuff can be engineered, if you do it right, so that extends the fiber network in an incredibly reliable way. The solutions that you can provide to customers are the complete solutions that you need, including content. This transmits voice, video, and data without any trouble.

I want to spend a minute on the concept of bandwidth on demand, because I think this is an important concept. One of the things that you can do, as you start to put together a variety of technologies, is you start to think about the way provide services a little bit differently. You can think about them in a way that others have not thought about them in the past. We think that bandwidth on demand in an import thing—and because of the nature of spectrum, we can allocate it and take it back at will with the right kind of radios. That allows us to use very efficiently and allows us to share with customers the advantages of a more efficient network. It's not as easy to do with a wire line network. You put it in. You put the fiber in the building. There's a certain amount of bandwidth there. You could choose not to use it, you could choose not the charge a customer for it, you could choose to

allocate certain portion of it, but your cost doesn't change. Using a broadband fixed wireless network to reach the customer, you actually use the spectrum as you need to in order to be able to service customers, and that changes your cost structure. That allows you to do a couple of things: That allows you to charge differently, it allows you to meet the needs of customers as they actually require it, and it allows you to do that in a way I think changes the services you can offer. It's one thing that we're focused very much on.

Now the real purpose of this talk is talk about wide availability. I spent a little more time than I intended to on the WinStar aspects of it, because I got so many questions about what we do. But wide available is something that I think is really a key. This is really the focus of our activity and it's really what I think is important. Wide availability is what the incumbents have wherever you are around the world. That's what they've got; they've got a widely available, virtually ubiquitous network in most of the developed world. In the developing world, they're clearly the most widely available companies. The problem they have is that their network is narrowband; it is truly narrowband. Despite all the time, money, and effort going into it, I don't believe it in the end that network gets upgraded with the copper. I think is has to be upgraded with new technologies for it to truly meet the needs of the future. So if you're going to have a widely available network, your going to need to have it to give birth to broadband era. Without lots of users, we all know that networks are not as valuable—that's what Metcalf's Law says: Network rises exponentially in value with the number of users. Well you've got to get there. You've got to get and you've got to get there sooner than rather than later to cause people to use the broadband services that people talk about. I think that we have a good shot at doing that. I think we can do that for a variety of different reasons. The demand is clearly there for the widely available broadband network if someone can build it. You take a look at the web-enabled businesses that we've got, the I&E commerce applications that are out there, and you see that e-commerce is supposed to be larger than our long distance industry now—very soon. How do you participate in that? It's a key question. Maybe we can talk about that in the discussion. I think that's a very important question. And wide availability's role for enabling that, I think, is quite important.

There's some size and scope of WinStar. Wide availability, though, I think we're going to have a shot at pulling it off. We're going to have sixty percent of the business market in the United States on the WinStar network

sometime in the year 2001—physically connected. We're going to connect those one hundred and fifty thousand buildings sometime in 2001. I define that as wide availability. I get the right to do that because I'm speaking right now. That's going to be an extraordinary event. There's going to be a broadband network available to over sixty percent of the business market: I think that can be the beginning of the broadband era. When I give this speech at developer conferences, I ask people to start to think about that in the way they're building software. Here, I'm trying to convince Martin to want to use our services so I can tell him we can't sell them to him.

The benefits of wide availability I've tried to focus on. The near ubiquitous network is really going to change the way we live. I am a real believer in this information age. I've believed in it for a long time, but I do think the combination of technologies is really what's required to make it happen.

Thanks.

## Marten Pieters, Executive Vice President, KPN Royal Dutch Telecom, The Netherlands

Thank you, Michael.

You have to treat my presentation as a kind of case study, because we've heard a lot of interesting stuff this morning and it seems to boil down—if you take the major questions—to a few, I would say, general questions, which we are all being confronted with apparently.

I represent a strange animal being an incumbent, but this incumbent is no longer only active as an incumbents, but is also sometimes a new telco, is sometimes a new entrant in a mobile market, is sometimes doing things abroad that we would like to avoid doing at home. You see that we are facing a lot of the problems that, in the end, boil down to a few strategic questions. I want to discuss those strategic questions, which are very well connected to what has been said before. But before that just to understand I would say our management issues—maybe just to show you a few details about KPN.

KPN is the incumbent and so still, happily, the market leader in the Netherlands. We would be, in my point of view, quite dumb if we had lost that already in a few years. We have over eight million fixed network customers, but if you add the ISDN channels, we have now 1.9 million ISDN channels, that would add up to far over nine million. We have about three million mobile customers, which is quite good. I'll show a picture later, which shows a little bit about the competitive environment. The Dutch market is supposedly for—in Europe, at least—for mobile the most competitive market, having five operators there. It's all big names: it's [unintelligible], it's France Telecom, it's BT, it's Vodafone. I think we have done quite well, but you see the competitive strength and the pressure on the margins of course coming.

Market capitalization of KPN is about twenty billion US dollars. In my point of view would classify us as being a medium-sized company. We are too big to be eaten easily, but we are maybe too small to do everything that our ambition would include.

If you talk about mission, then we say, yes, we want to be the preferred supplier in Holland for telecommunication services, but that was a very general statement that any incumbent could make. Now these days you have to more or less think a little bit deeper: What kind of services do I mean? What is the market? How do I define the market? You see that this old fashioned approach to the market—we can do it all for you—in fact there is no service in the books that we couldn't deliver does no longer work in this market. Because, especially from the competitive point of view, we are threatened by all kinds of niche players—I don't want to say that Winstar is a niche player, but it's taken a very focused approach. And it doesn't have this kind of "we can do it all for you." It has a very focused approach—and we see lots of those companies, so incumbents really have to rethink there strategy.

We have done a lot of investments abroad, although not as much as we would have liked to do. But there again, being not too big—sometimes you see these nice opportunities, but it's just difficult to grab them. For example, we have twenty percent of Infonet Services Corporation. We are twenty-one percent shareholder in [unintelligible], 20.5 in SPT, the incumbent operator in the Czech Republic. We are sixty-two percent shareholder of a new start-up company, which is completely targeting the data IP market in Hungry. There we have a joint venture with railway to roll out a glass fiber network throughout Hungry. We have forty-five percent share in second GSM operator in Hungry. We just invested money in Bulgaria: Sixty percent in a mobile operator, twenty percent in fixed line network. We have investments in the Ukraine. I don't want to mention more, but just to show that we have been spreading around, very much concentrating on Central and Eastern Europe, because there were lots of opportunities and they were more or less not that expensive that even KPN could afford.

But we are also seeing investments growing in Belgium, for example, where we see, of course, as a kind of extended home market strategy, that Belgium is a very important market, if you look from Holland. We have a company there called KPN Belgium, which in one hundred percent owned. We are also in the Internet business there.

All these nice adventures we have had and a lot of foreign investments—it doesn't show to excite the shareholders. You see the two graphs and it looks very much that investing in KPN is just investing in—I don't know what it is—but a kind of the Dutch economy, because we follow closely the general

trends on the stock exchange in Amsterdam. We would like to do a lot more than that—that's the ambition of the management at least.

Fifty-six percent of the company is floated. Forty-four percent is still owned by the government, but they do not in any way interfere in the business. They just act as a shareholder, in fact, a very easy shareholder. We were floated, by the way, in 1994, so we have quite some experience now over the years by being a listed company, which is a challenge in itself—especially when you are in these markets.

We did a lot of strategic thinking. During all the years we developed new strategic models and paid a lot of consultants—and in the end, this was the outcome, which is really surprising, isn't it? We thought that we were in four businesses. It took a lot of time thinking, you don't believe it when you see this, but that's how it goes. We thought we were in four businesses, but even if you analyze these four businesses, then it doesn't really work well, because data IP—yes, mobile, but a lot of mobile will be based on IP. Internet call media, yes, but Internet is, of course, totally IP. Fixed network services—that's the most difficult part of it, because that's where traditionally we've put our money. But if you look from a strategic point of view, in fact, that is the most difficult part. But what we did, at least, is we understood that these are different businesses. So "we can do it all for you," the one-stop shopping concept, we've left that and we've built business units around more or less business areas. For the data IP, we very soon came to the conclusion that "yes" you have a global offering, you cannot do that and say to the customer we have this nice transport service for you, but it's limited to the Belgium boarder. It doesn't really work, so we [unintelligible] request and started KPN Quest, which covered the US [unintelligible] by Quest, of course. We mutually cover Europe, KPN Quest. We brought in—Quest brought in—the unit, business customer ISP, and we are now building … an extensive glass fiber network infrastructure in Europe and that company is really targeting the data IP—let's say, starting with wholesale, but going up in the value chain very soon. You've seen the services that my neighbor has shown you; that's the kind of services we are delivering in that company. So there is at least a kind of vision [of] where KPN wants to go.

We're going to float KPN Quest this autumn, if everything goes right. So then you will see it on the market and, of course, we will also do that to create a kind of swapping currency to grow further. We strongly believe that this will be a matter of further [unintelligible] in the next coming few

years. We also strongly believe that paying very expensive incumbent dollars to buy this kind of newcomer is a very risky game for our shareholders, at least, so we better swap paper for paper; the risk is more or less equalized.

Mobile. We just last week released the news that we are going to separate our mobile unit, coming from the same type of thinking. We have a very nice mobile company. This is a little bit about the mobile company. You see the newcomers coming-in in quarter four 98, I mean the newcomers the third, fourth, and fifth operator. The second was there already for a long time. We are still doing quite well, taking in some forty percent of all the new customers. If you add that to our total market share we already had, we are still by far the dominate player in the market. But it's only Holland. Again, it's only Holland. So we need to grow there and are currently considering all kinds of strategic options. In the end, you wouldn't be surprised if you would find us doing something like the KPN Quest deal, because we strongly believe having local access on the mobile, but in the end it be at least a pan-European game and maybe even a global game.

The Internet and [unintelligible] media is much more difficult. KPN doesn't have a great history in content. We did some things, but were not always successful—to be honest. I heard more incumbent companies saying that. It's quite a different business being in media, being in TV content, these kind of things. So we are very much concentrating on call center: 800, 900 services, the directory services, advertising—we're quite successful in advertising also for our Web sites—and, of course, the whole ISP, the consumer ISP business, which is, in itself, a challenge today. With the new free Internet service model, the whole value change is changing drastically and dramatically—and everybody knows that if you don't do it, you're out-of-business, but if you do it, you don't know where you'll end with your business, so that is a challenging few years, I would guess, that we have ahead of us.

Again, what I said, fixed network services may be the most difficult part, because that's where the money was traditionally. We have some seven billion gilders invested only in fixed access network in Holland. That's a lot of money. How do you let that grow, how do you more or less make a future for that business?

A little bit about the result—you can see it's quite good, although we took a charge last year [and] that's why the [unintelligible] line is there, but that's a one-time charge.
Valuation is something strange being an incumbent. If look at the valuations of the new telcos, they are high, high ratios, P/E ratios—it's not an "E" because it's never an "E". High revenue ratios …, but you see that being an incumbent, we seem to have a very different type of shareholder. There's very little valuation in all the things we do, which are also new telecom operations within our big company. It's apparently very difficult for the market to see that. If, for example, some of the past valuation of KPN, then you will get a nine million fixed line business for about seven hundred fifty dollars per line. The question mark is, of course, why would a market only pay seven hundred fifty dollars for a fixed line, if the same market is prepared to pay five thousand dollars for a mobile subscriber. In the mobile business, we churn twenty percent per year, so after five years in theory, most of the customers have gone. In a fixed line business, it is still quite stable. Of course, we lose some market share, but it's not that dramatic. So something strange from the financial market's view—or they don't believe at all in fixed networks or they just don't see the value. I don't know. We think, at least, if look into an incumbent at this moment, the fixed line business is heavily undervalued.

Another thing we did is we went fast international, compared to a lot of European incumbents. An one of the things that we said was "yes" we will see that margins and results will be under pressure in the home market, because having one hundred percent market share will be very difficult to grow, although that's where we underestimated the overall growth of the industry, of course, like everybody did. So we went abroad and we said let's go into these nice markets where there's still growth possible, and we can replace then our financial results over the years by getting more revenue and results from abroad. That will more or less balance the loss we will have in Holland. But the strange thing is that even if you look today then you see at the operating income for international activities, it's about zero. So what you learn, of course, is that it takes a lot of time. And we see that with all the startups in the new telcos, because most of them make heavy losses. Revenues go up, we've seen a lot of half-year results in the last few weeks, and what I more or less see in them, analyzing them, is that revenue goes up, but loss goes up just as quickly. So the difference doesn't make a big difference apparently. The question mark is how long does it go. We, of course, see the same with international investments where we often are in a

startup position of have to pay lots of good will which you have to depreciate. So from a shareholder's perspective if I would like dividend and I would like results today, then I really question where this ends. But apparently a shareholder in a new telco like it, but a shareholder in an incumbent telco has problems with it. Although we see now and you see the number of two hundred and thirty-one million, result we get from our participation. That really starts to get work. That works now.

That was more or less some data about our company, so that you will better understand why we're wrestling with some strategic issues. I would approach it—let's say it's in line with what's been said before, but a little bit more analytical. In fact in my point of view, we are only talking about technology that means access technology, and we are talking about services. There's a few access technologies, you see them here, but maybe there are more, I'm not a engineer. This is, at least, what I understand. What you see is that, of course, we are as an incumbent in the fixed line business with twisted pair. That's our business. If you're a cable company, you are in the fixed line business with maybe coax or whatever. But it's just an access technology. You could replace it by point-to-point, point-to-multipoint. You could replace it by mobile. You could replace by satellite. We have discussed already about Iridium and maybe ICO.

If you look at the development in mobile, there you see the development towards broadband also. So everything goes maybe toward broadband, but the question mark is, of course, which of these access technologies is best positioned.

And then if you look at the provision of the services, traditionally a telco has been delivering at quite limited, but valuable, proposition to the customer. In fact, it started with voice and we added, of course, a lot of things on the voice. But if you look at the revenues, still lots of it are in voice. Now everybody is talking about video, video on demand, of course, the Internet, entertainment, distance learning, whatever.

But it's very nice, even this morning, when I listened to the discussions, we have so confused ourselves, we're talking about the data business. The data was only computer sending zeros and ones to each other—that was data. And now we say is a [unidentified: sounds like "SMS"] message on your mobile—yes, that's data, because we still see it as data. But a video is also data. Video on demand will be data because it is all IP-based. So we're

even confused about the semantics. We are mixing up technology with services. I think we should, at least in our minds, be very sure what we're talking about. From my point of view, we're talking services. We will have access technologies and we will have services, but you can get it in several ways.

I come to my questions, because I already told the inquirers team that I would surprise them by putting the questions at the table for them. What, for example, are the relative, more or less competitive positions of these access technologies? I think, in the end, coming back to a very high abstract level in our industry, if you want to make, to create real shareholder value, you have to be very entrepreneurial, you have to have a vision, and you have to make the vision work. That's what I liked about the speech of my neighbor. He is really—he has a vision, he believes in it, and he makes it work. And that's what you have to do. Maybe in the end, it's the wrong vision, but at least you were heading somewhere. And that's a problem of the incumbent, because the incumbent is in a lot of businesses so to say, and is more or less [unintelligible] copper network, but we have to develop a vision. How are we relatively positioned towards other access providers? Of course, the big game has been mobile/fixed, but there will be a few other games. If you look at, for example, fixed/mobile convergence. If I would pick a business plan of one of our subsidiaries two years ago, all of them were full of fixed/mobile convergence. It was hot. Everyone was writing about this and coming back to the cordless telephone and the telephone [companies] said yes this will be the new packaging of services and you need to be in both, blah, blah, blah. Today, nobody is seriously talking about fixed/mobile convergence, because the Vodafone Airtouch development seems suddenly to more or less shifted the paradigm and the whole industry is looking at a different direction. Mobile is something special and yet there will be fixed/mobile convergence, but we can do it on a kind of arms-length basis contracts, [unintelligible], or whatever you need.

That is quite a shift, because being an incumbent and being in the fixed and mobile business, at least until let's say a year ago, we were feeling quite comfortable, because everybody thought that was very good to be in both businesses. And suddenly that comfortable feeling is gone.

Another interesting things is the pricing. There has been traditionally a premium pricing for mobile, which is now in a very high speed going down. But if you look at the investments, at least in the existing mobile

environment, then the investment in mobile is far lower than in the fixed line. So in the end if you would take price as a very important distinguishing factor in an access technology, again, I'm only talking technology, access technology, so in the end why would pay more, that is one of the things we also learned from the Iridium case, why would you pay three dollars a minute, if you can get it for thirty cents a minute. And so the access technology and the price of that is very important. Traditionally, again, mobile is being higher priced. We see that now merging or converging or whatever word you want to use. But how will that develop in the future, especially if you look at the 3G technologies, UMTS. The business cases, I've seen, I was really astonished by the level of investment you need. For markets, in one country, in Europe let's say UK or the bigger markets—Italy or Spain or Germany—there will be a multiple of investment needed for UMTS, if you count all the operators together—a multiple of the money that was invested in Iridium. How are we going to earn that back? It's a multiple of the existing investment. It's only adding on or does it really deliver so many new applications. And where the applications and is the consumer or the businessman prepared for pay for that. If you say, well, we have to do it, and just do it and make the investment, then I think that's a dangerous approach. But we have to make up our minds, if we do, because the licenses are only there once and once they are one, they are gone.

This is not about access technology, but this is really about the services side. What about branding? In our industry branding is very, very little developed. I worked for ten years in the food industry and that is, I would say, a far more mature industry in terms [unintelligible] you compete on and you compete on brand. That's in the end where you win. But you see that in our businesses, we are very much talking about number of subscribers. Take the mobile business. Which is the strongest or best positioned mobile player in Europe? If you look at the number of subscribers, the big ones like Deutche Telekom, Telecom Italia Mobile are very big. I don't know numbers, but let's say ten, fifteen million or even more customers. But they're only in a very limited area. If you would see branding as a very important point toward the future, if you really believe that mobile service offering will be Pan-European service offering, if you really believe that a customer wants to have a real seamless wireless service offering throughout this area, then maybe companies like [unintelligible] who is in more countries hand has a very good branding policy is far better positioned than the bigger Telecom Italia Mobile or Deutche Telekom. We didn't really, I would say, develop a lot strategy there. And you can understand it, but even

if you look at Vodaphone Airtouch, that seems to be an incredible strong friendship, but if take county by country, where there are in Europe, then you say they have a lot of different shareholders, they have a lot of different brands, sometimes they're in control, sometimes they are not in control, so from a branding perspective, it's quite a difficult starting position.

Very important for an incumbent operator is who is going to win. Is it the cable TV? If you talk about high-speed Internet access type of services—and then I'm talking again access. Or is it the incumbent? I want to do a poll. There are a lot of people here from different types of companies. Who thinks that in the end the cable TV company will win? And who thinks—let me just put it the other way around. Who thinks that the cable TV in the end the win if you compare it the incumbent telecom operator? Raise your hands please. Who thinks that the cable TV company is going to win? You are very conservative, very conservative. Because I've seen audiences where at least half the people think that the cable TV from a technological point of view is in a very good position to grab a lot of the business. Apparently here are all people who are paid by incumbent telcos. I personally am not that comfortable that we automatically win it.

So coming to conclusion. I would say that the one who is able to make the right judgment of these kinds of questions is going to win the game. And being a representative here from KPN, I would say that the nice thing about this, there's two very nice things about an incumbent, and that's they have the customer and they have the money—huge cash flows. So in my point of view we would be quite stupid if we wouldn't be able to adjust ourselves and to find the right models and ways to grab the business. But it's difficult, because again you have to make the strategic choices and you can only make them once. Since we, I think, all are more or less sometimes uncertain and sometimes very certain, I hope that we all do our best. At least KPN is struggling with it. We have the direction set. I hope that in the end we are only to at least survive in this industry.

Thank you very much.

## DAY ONE (AFTERNOON): SEPTEMBER 13

## WELCOME REMARKS
**Rt. Honorable Donald Dewar**

## ROUNDTABLE DISCUSSION
**"Diverse Systems and Service Offerings"**

**Presenters:**

**Keith Mallinson**
**Yuichi Ishimaru**

## The Right Honorable Donald Dewar, the First Minister of the Scottish Parliament and Head of the Scottish Executive, Scotland

Thank you very much for allowing me to break into your proceedings. I think the first thing you've long since learned is that if you invite politicians along they usually wreck things. The well-planned agenda has obviously been greatly disturbed. I apologize for that. The other thing I can say to you is that as a politician I'm well aware of one great rule. And that is when I look at my audience it is likely--likely that they will know less about the subject than I do. This is because I address public meetings and usually pick topics where I feel safe. On this occasion, I feel extremely unsafe. I recognize that this is for a working politician the kind of event that might be described as a nightmare, because quite clearly almost everyone here is an expert of formidable proportions in a subject in which I am not. My one consolation is, and I hope I'm right, is that there are not questions at the end of my remarks. For which mercy kind thanks. My job is very simple, in fact, and that is to say welcome to Edinburgh, welcome to Scotland, and welcome to digital Scotland.

Edinburgh, if I could just spend a sentence on it, is a city of which we are extremely proud. There are enormous crops of cities around this continent that claim to be great European cities. I think that the evidence for Edinburgh is rather more compelling than many. I very much hope those who are not familiar with the city enjoy it and enjoy its delights. We are really pleased to have Intelevent here and I am delighted to welcome you a major players in the global telecommunications industry.

We in Scotland certainly aspire to be leading players in the global information age and this is something about which I am very, very enthusiastic. In fact in a sense, if I can say so, as you will have gathered, my appearance here is not in fact to add to your technical knowledge. But I think it is important that I'm here as a symbol of our commitment to change and our very serious intention of, in fact, being a leading player and being upfront and up-to-speed with all that is best in the revolution that is taking place around us. I'm again conscious of being from a generation which does if fact leave a gap between me and much that is happening and a gap which probably I would find quite difficult personally to adjust to. But I am tremendously keen on the benefits of it. I do recognize the all of us have got

to adapt and above all our economy has got to adapt. Scotland is a very typical country in western Europe I suppose. We made our reputation, we made our wealth upon steel, upon coal, upon shipbuilding—and now all these are in retreat and what are seeing now is an economy which is becoming very much based upon new technologies. Where communication is above all what matters. And where, if I can say so, one of my great satisfactions is seeing the way in which geographical location becomes unimportant as expertise and technical skills grow and the right systems are in place to allow initiatives to flourish. And thus we are seeing jobs, we are seeing developments, for example, in the Highlands of Scotland where once only sheep roamed and where people probably took the view that there was no industrial or technical future. And that's glad. I'm glad of that. It is a little bit of an—I suppose—[unidentified word: sounds like "unrescuer"] in the sense you'll be glad to know that whenever my new colleagues, the members of the Scottish parliament, rolled up on the first day, they were given a laptop, many of which looked at somewhat doubtfully. When we give them parliamentary answers to questions, they get them on e-mail. We are trying, as I say, to do something to make our own parliament accessible and to improve communications as well in the area of politics. But I think the main message is the recognition that governments, like telecom companies, seem always to be living in exciting times. The pace of change constantly increases. There are really times of potential, times that we can really revolutionize the way in which you operate. You are riding a wave of change driven by technology, by changes in the regulatory framework, and by the opening of global markets. What you do and your success is enormously relevant to what I do. And I suspect my ability or the ability of those who advise me to keep up with what you are doing will very largely condition the success I do or do not achieve. The challenges simply could not have been imagined ten years ago. The challenges you have been grappling with for some time are very much on the agenda of every organization in Scotland [and] every government in the world. And I hope and I believe that we in Scotland as politicians are ready to tackle those challenges. We are committed as an executive for making Scotland the knowledge economy to a digital Scotland and the new Scottish parliament should well placed to understand and foster these changes. Our partnership within the United Kingdom gives the continued access to work of the UK government with the work that has been undertaken to drive those changes forward. We are committed to partnerships between the public and private sectors. Above all, we are committed to success. And if we are to succeed as politicians, regulators, telecom providers, businesses, the public sector,

there is one thing that we have to keep very firmly in front of us and that is: being digital is no longer, if it ever was, about technology alone. This is not something which companies or public sector managers can leave to the IT department, some sort of technical magic the happens down the corridor or three floors below and you don't need to bother to much about it. It's not just a matter of something that drives existing systems a little more efficiently. It is in itself a revolution. It affects the way we work, our society, our culture—it affects every one of us. And nothing demonstrates this point more clearly than e-commerce. It is an entirely new way of doing business, not simply a new technique laid over old processes. As I speak--that sounds rather dramatic, doesn't it--as I speak, the Prime Minister is in Cambridge to launch a United Kingdom government report on e-commerce, with key recommendations to increase take-up in the United Kingdom as a whole—and Scotland will be very much part of that movement. At the start of 1999, Tony Blair commissioned the Performance and Innovation Unit [PIU] of the Cabinet Office to look up barriers to and opportunities for e-commerce. And to recommend a strategy to meet the Prime Minister's stated objective of making the United Kingdom by 2002, the best place in the world to trade electronically. We want to share in that work and it is our aim to benefit from it. The report, as I understand it, identifies four key barriers to the adoption of e-commerce. One is simply the foundation, the lack of a clear internationally agreed regulator policy. The second, of course, is understanding, the low understanding of the potential benefits and challenges at all levels. That is a problem that I am sure still runs in this part of the United Kingdom as it does it most European and indeed world economies. Access is also a fundamental, access to ICT, the social-inclusion dimension—and trust, the fear of fraud. Of interest to you is further major recommendations of the PIU report to improve access by ensuring that telecom regulation encourages tariff structures which reflect the different patterns of e-commerce compared with traditional voice telephony. E-commerce demands continuous connect to an electronic marketplace, not occasional calls to customers. The report lists sixty detailed recommendations and action points across all four barrier areas. The Scottish Executive welcomes the PIU report and we shall be considering carefully implementation here of the relevant recommendations which fall within our particular terms, reference, and area of responsibility. To our worker on the knowledge economy, the Scottish Executive is already galvanizing interest in e-commerce and ministers will be working to focus attention on e-commerce in forthcoming engagements. It is clear that we need to accelerate the adoption and use of ICT for business purposes, if

Scottish businesses are to compete in a global e-commerce environment. New models, new business models and markets are emerging. The train—if I can rather stretch a metaphor—is leaving the station. And in many parts of the world, particularly the United States, companies are already on board. To straining it ever further, we are determined to be on board and a quick and effective response is essential. I acknowledge here the work that is already in hand by Scottish enterprise that has recently embarked on the development of a national strategy for e-commerce: To direct [unintelligible word] and future e-commerce commercial activities. The process of developing that strategy, specifically aims to build a common understanding across Scotland of what's required for e-commerce success, providing a context for more effective and coordinated activities as well as enabling the sharing and development of best practice. The main focus of the strategy will accelerate the uptake of e-commerce by Scottish business and organizations and will include clear targets for numbers of businesses in Scotland engaged in e-commerce. The vision is Scotland as a European hub for e-commerce. The strategy will, of course, take account of the PIU report recommendations and the UK context. The strategy document will be released for consultation in the next few weeks.

I want to mention to you some news for Scotland businesses in the infrastructure side. The Internet Society of Scotland is leading the development of an Internet exchange here in Edinburgh. And I'm delighted to be able to say that my colleague Henry MacLish, who is the Minister for Enterprise, in my cabinet, will be launching Scot IX tomorrow. The exchange will help to make Internet traffic through Scotland quicker and more robust and should act as a great incentive to web-based inward investment. Indeed Scot IX is ready to meet this demand by providing co-located business facilities within the exchange premises. I know that the advantages of co-location of the exchange have already been recognized more widely and another facility by [unintelligible word] nearby. Scot IX has been driven forward the private sector working in partnership to the benefit of Scottish competitiveness. I want to congratulate these partners, including BT Scotland, for their achievement. It is, I think, one of the marks of political development in Scotland over the last few years that there is now an acceptance which has perhaps been overdue of the importance of partnership, the importance of genuinely good relations, common objectives, common aims between government and the private sector—because our interest overlap spectacularly and clearly. If we can work together, than we can be very, very much more effective than would otherwise would have

been the case. I look forward to seeing that collaboration developing in many areas, but this seems to me to be one of the most key and one of the most appropriate. I know Vin Cerf, representing the Internet Society, is here this morning, as the Internet Society's guest. And in honor of the Scot IX launch, I look forward to meeting him.

I hope you will agree that these exciting times for Scotland. I make an awful lot of speeches about exciting times. There really is a lot happening in the constitutional field. We're changing the face, I think, probably of British politics--certainly of Scottish politics in the administrative structure for good or for ill. I'm an enthusiast about the potential, but we're doing it in that political field. But there are also exciting times, as I've said, for Scottish business, poised to take advantage of opportunities of the information age. It's a tremendous challenge. And I hope that you in this room and the organizations you represent can contribute to the meeting of that challenge and overcoming of the problems and sometimes the inertia the inevitably exists when we faced with very, very challenging technological change. The ability of the public and private sector to work in partnership makes me confident that Scotland will be very firmly on board the modernization of our economy, which is very much into, as I say, communications of every sort and to bring technology into electronics and to all the industries of the twenty-first century. That is a movement that we must reinforce, which we must speed on its way. And the contribution of the technological change that you represent, espouse, and advocate is an enormously important part of that process. I am very glad, therefore, to welcome to you Edinburgh and I hope you have an extremely productive series of discussions and exchanges. Thank you very much, indeed.

**KEITH MALLINSON**

**Managing Director**

**The Yankee Group Europe**

**UNITED KINGDOM**

## Does Telecom Lead or Follow Economic vitality? The dark side of globalization and the effect of regional economic downturns on global telecom markets.

"Sit back and watch the meter digits grow"

PTT FD cocktail party anecdote from late 80s. Comparing "organic growth" for dominant carrier against speculative effort in liberalised or other competititve markets.

Many studies have shown a strong correlation between economic growth and telecommunications consumption – particularly when consumption is measured in financial (eg. dollar) terms.

Economies that grow do tend to increase their teledensities and consequently total telecom revenues.

But even if they don't increase lines revenues per line will tend to increase as more people queue-up to make longer calls on the limited number of phones available.

But causality either way is difficult to prove. Perhaps it's a bit of each?

The current US economic growth miracle suggests that technological leadership in telecommunications with innovations, such those in datacoms and Internet, has fuelled growth.

On the other hand, it is intuitive that there is causation with the old tale of the farmer in the interior of an undeveloped nation. When he suddenly gets a phone, and with it access to information on price changes and other market conditions, he is in a much better decision to make rational choices and stop growing what there is no demand for and start or increase production in other areas. He may also be able to start shopping around more to get a better deal on supplies like seed or animal feed.

### How does this economic relationship impact the market overall with carriers, equipment vendors and end-users?

What effect will a slowdown or major economic shock have for each.

Causality aside, the high correlation between telecom revenues and GDP is matter of great interest for economists and of great impact to certain vested interests. Nowhere is this correlation more significant that in international telecommunications. Traditionally exorbitant prices for international telephony were monopolistic milking by PTTs and governments for other worthy national causes.

## What can we learn from Asia's 1998's GDP Meltdown

Mobile phone demand dropped 80% in Indonesia last year

Satellite launches, eg AsiaSat 4 and other infrastructure builds delayed

Private telcos still owe $900 million in unpaid fees inIndia. This is a particular problem involving a political stalemate. Licensees paid too much in many instances. They cannot afford to pay. Although there is little prospect of them doing so, politicians risk the wrath of voters if they let the capitalists off the hook.

## Did the Asian crisis destabilize the world economy thought increased globalization and communications?

The simple answer is no. From the telecommunications supply-side's point of view for global carriers like BT and Global Crossing, or vendors like Fujitsu and Newbridge, the world is seen as something of a portfolio with some regions performing well when others are down and vice a versa. And users benefit from globalization in times of economic downturn through having better access to markets where conditions are better.

A more vexing question is what effect a major downturn in the US might have nowadays, with the US being the epicenter of so much in the communications sphere.

## Look on the bright side

The supply side is not the only interest group and dollars; rubles, rupees or rupiah for that matter are imperfect metrics for end-user welfare.

If prices respond to deteriorating economic conditions then actual demand in minutes or Gbps might hold firm. End-users and even equipment vendors might not be adversely effected in many cases.

Although some new investment programs will be postponed, existing project sponsors with massive sunk costs will be even keener to fill capacity.

Even if services like telephony or fax do become or remain too costly, this may stimulate innovation or the use of cheaper telecommunications substitutes like e-mail. Use 1999 anecdote of e-mail versus fax in Russia w.r.t lower price and higher availability against my laziness and price insensitivity.

Some of the most innovative markets are with lower GDP. For example, Short Message Service penetration exceeds 60% of subscribers in the Czech republic with usage particularly high among youngsters.

Similarly, lower price innovations like pre-pay cellular have been boosted enormously by the adversity of being in a recession (as in Asia currently) or by just being plain short of a good credit history or dependable income.

## The Golf War Effect and Economic Shocks

The gulf War had only a rather modest macroeconomic effect on the world economy, but it did illustrate a highly relevant substitution effect.

Fear of flying prompted many people to use telecoms instead with a substantial growth in videoconferencing. Subsequently, the interest in videoconferencing waned. God forbid, a bigger global military crisis would most certainly stimulate telecoms whatever the effects in the international economy.

Similarly, a major economic or other shock will stimulate other substitution effects. Telecommunication is a veritable goody-store of new offerings for end-users. All the laggards may need is a little economic crisis to make them reduce their more costly habits of the past and engage in new, possibly more effective methods, such as e-mail, Web-browsing, e-commerce and the like. Once bitten, for ever smitten. They may never go back to there old ways.

## Supported by a flood of primary reseach including interviews and surveys in every region of the world in many areas related to telecoms and the Internet the Yankee Group identifies or believes

Massive Moore's law-scale improvements in telecoms switching and transmission through silicon and optronics provide increased utility year –on-year which outpace variations in economic growth.

The Asian turndown shows that short-term problems can ensue through economic shocks.

Led by the US and Europe, Latin America also illustrates that economic and regulatory reforms in telecoms can help deliver stable growth in both GDP and telecoms. As in the North, the Yankee Group observes that Internet and cellular subscriber growths have been growing at and are set to continue at near 50% per annum growth.

Some good can come from the adversity of an economic shock. This is much more likely to happen now in liberalised markets where market forces will respond supply-side consolidation and price reductions. Even a protracted slump may yield benefits through improved efficiency or effectiveness if users restructure and substitute bandwidth for more costly activities like transport or printing.

We just have to hope that such shocks don't cause politicians and regulators to lose their nerve and slow the pace of essential reform.

The Yankee Group has recently done quite a lot of bandwidth demand modelling. In these we are predicting growth rates which are in some cases approaching triple digits when measured in Gbps rather than dollars. Even strong economic shocks will have effects which are mostly well within the margin of forecasting error for bandwidth demand growth in places – particularly where supply is abundant like across the Atlantic.

**YUICHI ISHIMARU**

**Managing Director**

**Marubeni Corporation**

**UNITED KINGDOM**

I

#1

Good afternoon Ladies & Gentlemen. Please allow me to introduce myself. My name is Yuichi Ishimaru, and I am the Chief Executive for Europe and Africa of Marubeni Corporation, based in London. In my previous post as Chief Operating Officer at Marubeni America Corporation, I had the privilege of working extensively in telecommunications, and was able to witness first-hand the genesis of the Information Revolution and its impact on the telecommunications infrastructure. During this time, I was fortunate to have the opportunity to work with many prominent leaders in the industry, many of whom I am pleased to see here today. Therefore, it is my great honour to be invited to speak on behalf of Marubeni.

First, let me explain a bit about Marubeni.

Marubeni Corporation is a core member of the Fuyo Group, which includes such well-known firms as Hitachi, Canon, Nissan, and Fuji Bank. As one of Japan's leading enterprises, Marubeni boasts a global presence developed

through 135 years of business experience. Marubeni deals in over 40,000 products with offices in 79 countries. We act as intermediary and broker, major financier and organizer, risk manager and business consultant.

**#2**

Consequently, business theorists often conceive of Marubeni Corporation as a type of Japanese company known as *sogo shosha.* Although the accepted English translation is "General Trading House", I personally believe that this perception leads to misunderstanding. In my opinion, the phrase "Business Integrator" more accurately represents Marubeni Corporation's function as a *sogo shosha.* While it is true that Marubeni often serves as a trading company in the traditional sense—acting as an intermediary between supplier and client—the *sogo shosha's* greater role is to fill in the "missing piece" needed to realize business opportunities successfully. Whatever it is that the enterprise needs - whether it is lacking capital, personnel, information, business networks, risk management, etc., it is the *sogo shosha's* inherent role to provide these value-added components. For many small and medium-sized

companies both in Japan and abroad, this service is essential to the survival of their business.

II

#3

It is with this understanding of the *sogo shosha's* role that I first became involved in the information and telecommunications industries at Marubeni America. During my tenure there, Marubeni had the foresight to invest in several ground-breaking projects including two undersea fibre optic cable networks—FLAG, connecting the UK and Japan, and Pacific Crossing-1, connecting the US and Asia. Moreover, through Global Access, Marubeni co-financed and is managing a terrestrial fibre optic cable network in Japan.

Both friends and rivals often questioned whether such aggressive investments would ultimately be profitable. While there is no doubt that for each project there existed sound reasoning to justify our investment, I had a separate

purpose in mind. As that very purpose corresponds to today's theme, I will endeavour to elaborate.

The Information Revolution has had a profound impact on all industries. It will eventually force companies to reform the fundamentals of business flow as these various industries struggle to bring the end-users into their sphere of influence. The results of this unilateral reorganization will be the cornerstone of a new business model, making the battle for consumers all the more essential to survival.

Effectively tracking patterns in consumers' purchasing habits has been the enduring paradigm of marketing throughout the years, however these patterns are radically changing as the Information Revolution transcends national borders and expands the scope of consumer purchasing world-wide. As the internet starts to breed a culture of its own, we begin to see the emergence of a capitalist utopia where the location, race, or religion of a business or consumer is no longer relevant. As language and cultural barriers yield to the unifying

influence of the Web, previous limitations on businesses will cease to exist. Consumers will buy products from the supplier who gives them the best quality at the lowest possible price.

#4

We are witnessing a migration in consumer decision-making from passively accepting information from existing media—like newspapers, magazines, and television—to actively researching and making decisions based on global information sources. To accomplish this, individual consumers need to utilize established infrastructure, and consequently, the portal business is flourishing.

III

Today it appears that the information industries are outdistancing the manufacturing sector, however it is my expectation that, once this new business model is put in place, manufacturers will once again have the upper hand.

#5

Due to the industry deregulation and the advancement of technology, the cost of telecommunications is radically falling, to the point where these costs will soon be lower than the manufacturers' current marketing costs. In fact, a company called Freeserve, now the number 1 internet service provider in the UK, is sponsoring free access. In the US, companies like NetZero and Freei.Net and, more notably, AltaVista, Microsoft, and AOL, are offering free access. Soon all network members will be able to have internet access without having to use an internet service provider.

According to industry experts, free internet access is the only way e-commerce will gain widespread international popularity. As more companies offer free access, the internet service market will become much like that of the TV market—free service co-existing with premium services offered for a subscription fee. As more companies offer free access, the number of internet users worldwide will increase dramatically, resulting in an increasing demand for e-commerce. The thought of such a large pool of

consumers, whose demographics and buying patterns are so easily discernable, truly is a marketing dream come true. Manufacturers have only to take advantage of this wealth of information.

On the other hand, internet-related businesses will have to find efficient ways to attract customers and create powerful brand awareness strategies. The marketing costs of e-commerce enterprises will skyrocket in the coming months as they strive to distinguish themselves from their competition. Diversification of products will be essential for these companies to maintain a customer base and create loyalty to their particular e-brand. Let's assume that we have a company with a customer base of over one million. If we are successful in promoting the regular use of our network, we can then easily diversify our product range among these customers.

I could name dozens of companies that have used this very model to standardise the way we do e-business worldwide.

IV

A classic example of a case study, which illustrates what I am trying to describe, is that of a certain supermarket who, when they gathered and analyzed their Point of Sales data, found the sales curves for disposable nappies and beer were almost identical. The store decided to place them on the same shelf, and sales of both products increased. What this store realized was that the market segments for both products were the same—young married couples. This stands as a perfect example to the future networking business. In this new economy, we have to completely re-evaluate consumer purchasing, to identify these new and occasionally counter-intuitive patterns of behaviour.

In this business model, we will be able to monitor these buying patterns constantly and to customize the marketing for these consumers, effectively placing the beer and nappies on the same virtual shelf. This enables companies to achieve the greatest possible return on their advertising costs

while providing consumers with personalised information. Thus, once you have established the customer base, it is simple to expand sales by offering consumers only what they want.

In the end, who will come out on top? This metamorphosis will naturally be a course of trial and error, during which many companies will succeed and many will fail. However, the answer to my question is deceptively simple: the ultimate winners will be the companies who first establish the physical networks on which this business model depends.

V

I hope I was clear in describing my vision of the future of networking, but how does a business integrator like Marubeni contribute to this development?

It is not easy for many people to adapt to this changing world of networks in the information and telecommunications fields. Telecommunications

engineers say that there are seven categories of internet protocol. I, myself, do not understand all of these, but as a manager, all I need to know is that there are three important layers—infrastructure, platform, and application.

#6

The infrastructure is a physical entity composed of both fibre optic cables and wireless networking systems. The platform consists of the router and server that depend on the infrastructure. The application, jointly supported by the infrastructure and platform, is the developing service that utilizes this platform. The application answers the demands of the individual user with the infrastructure and platform jointly supporting it.

#7

Now that we have established this, I hope you understand my greater purpose behind Marubeni's investments. In this network, the component that is most difficult to control is the infrastructure. Please look at Marubeni's infrastructure of PC-1, FLAG, and the network of our partner, Global

Crossing. As of next year we will be able to utilize this global network fully, and I think the logic behind our investments is clear.

For me, the next step is to prepare an efficient and accessible platform to place above our infrastructure, but the most important part is certainly behind us.

VI

#8

In order to invigorate the *sogo shosha*, every department in every division needs to adapt to this networking structure. However, this will not be an easy task in our corporate culture. In a 1999 survey on top executives of Fortune 1000 companies conducted by Anderson Consulting, it was found that while 80% of Japanese corporate executives use the internet more than once a week, only 15% said they feel comfortable doing so. Conversely, about 90% of US executives access the web at least once a week, while 60% are comfortable doing so. In fact, Japan ranked the lowest among developed countries in the survey. With a projected 70 million internet users by 2004, Japan will once

again have to demonstrate its great flexibility and open-mindedness in order to catch up with the rest of the world. However, how we plan to achieve this goal is the subject of another speech.

#9

As I have said, Marubeni's primary function is to provide enterprises with the value-added services they require to realize their business objectives successfully. Through the strategic investments I have described to you today, Marubeni has poised itself to take full advantage of this new information economy. In sum, it is clear that this very network will be the most important "missing piece" into the next millennium.

# DAY TWO: (MORNING): SEPTEMBER 14

## KEYNOTE PRESENTATION

## ALFRED MOCKETT

## Alfred Mockett, President and CEO, BT Worldwide, United Kingdom

Thank you, Ron, for those kind words of introduction.

We almost have a full house, but I see a few of our members did heed the hurricane warning and have already headed inland. Delighted to see that so many have you have turned up this morning. Delighted to see that you can soar with the eagles after hooting with the owls last night.

I'm here to talk about the most valuable letter in the alphabet: the letter **E** [pronounced "ee"]. It would appear that even government now is getting on the bandwagon. We have in the UK Mr. Ton **E** [Tony] Blair, our Prim **E** Minister, announcing his **E** nvoy [envoy] yesterday. It would appear that if dot com doesn't figure in the name of your company, then when you're looking for a prefix, you have twenty-six options available, none is better than the letter E as a presage to future wealth. Especially when attached prior to an IPO. I think this city is particularly well-placed, **E** dinburgh, but perhaps not so well placed as Scotland, which tends to be little disadvantaged in that area. Alphabetically disadvantaged relative to its peers, all sporting **E**'s in their name within the United Kingdom.

But on a more serious note, I'm delighted to be able to follow the First Minister who spoke yesterday. I think that the fact that the First Minister took the time to come here and make a presentation shows the huge importance that governments attach to e-commerce. I look forward to the much talked about appointment of the UK government's **E** nvoy.

I'm also pleased to see that yesterday's cabinet office Performance and Innovation Unit report on e-commerce advocated a light touch to regulation. The boom in the UK telecommunications over the last fifteen years could not have happened without fundamental deregulation. I believe if the government truly wants the UK to be on the forefront of e-commerce, it must indeed stick to this principle. Now, I'm here with a simple message: We're in the midst of a revolution that's reshaping our lives. We as a group must drive this change. This morning I'll look at the impact of the e-commerce revolution and the key issues we face. I hope this will be useful stimulant for your session at 11:30 this morning. Now, I'll be speaking from the perspective of a global communications provider. I will, therefore, be

giving you different view than you might get from an online book vendor, a database software developer, an Internet data center operator, or, indeed, a national telephone company. I will, however, be avoiding any specific predictions. Whenever I am tempted to do so, I simply remind myself of Lord Calvin, President of the Royal Society in 1895, who stated "radio has no future, X-rays are hoax, and I have not the slightest molecule of faith in any form of aerial navigation of [unintelligible] ballooning." So goes the ways of predictions. But one thing if for sure, e-commerce, e-business and the Internet are epoch making ideas. And the problem with epoch making ideas is that they're greatest impacts are often not on that for which they were invented. A new discovery does not reach its full potential until improvements and associated discoveries and innovations have become part of it. Take, for example, the automobile. This did not only change the way we travel, it changed the way we shop, it changed the way we eat, it changed the very structure and locations of towns and cities in which we live. Ladies and gentlemen, this is about change; the challenge [is] for others to assess in what and how quickly. E-commerce is, in fact, driving change; it's the vehicle that will transform business process, relationships, [and] strategies through the application of network technologies, particularly Internet technologies. But it's not a single technology, a single business model, but evolving set of protocols, platforms, interfaces, business models—all of which are changing so fast that any rigorous description is almost obsolete before it is rendered. E-commerce is in transition, transition from an earlier adopters toy to a standard commercial distribution channel, from the domain of the very largest and the very smallest of companies to the mainstream mid-market, and from a thin, perhaps fragile, veneer that lays over heritage systems and processes to the very core of companies operations. The transition will be manifest not only in the products or services visible to the public, but also in the basic structure of manufacturing, marketing, and distribution mechanisms. And in the contraction of distribution chains as new and more efficient channels displace traditional multi-tiered structures.

So what's necessary for the acceptance of e-commerce as a standard business tool? Consumer trust is fundamental. Consumers must be confident that their personal information will be safeguarded and that their transactions will be accurately, securely completed; that their goods and services will be delivered and that they will have recourse after the transaction. Now BT has begun to address these consumer issues via services such as Trust-Wise, already deployed in the UK. In the Trust-Wise

service model, BT maintains digital certificates on behalf of Web-based merchants and others. Potential customers, potential trading partners contest the validity of a web-based offer by simply clicking on the Trust-Wise button on a particular vendor's Web site. This causes a jump to a BT-run Web site that manages the digital security certificates issued on behalf of the clients. BT is also taking the lead with WISE, the world-wide insurance e-commerce model; a new global service for the commercial insurance industry which solves the problem of trust for brokers and insurers trading over the Internet. The service enables companies to transfer information quickly, easily, [and] securely. Members are able to leverage their existing IT systems, because the service uses open IP standards and nonproprietary software, making it available via the Internet, while the use of BT Trust-Wise in association insures the participants that the identity of the individuals with whom their transacting business. This system already has twenty-five thousand registered users, participating brokers who are now able to submit risks to secure web sites, allowing insurers to view the programs and make underwriting offers.

Now internally, we are also leading by example. We've established one of the largest Internet sites in Europe. It has over six million pages of information and achieves five million a month—that's the authorized hits from employees, not the unauthorized pings on the firewalls, many times that number, I might add. Now in the first year of operation, BT achieved a saving of over three hundred million pounds with the system, [and] in the second year, seven hundred and fifty million pounds. Both sets of figures have been externally audited. We believe that subsequent savings are amounting to more than a billion pounds a year. But we no longer audit this, because using the Internet has become as much a part of a BT employee's life as using the telephone. The pure cost benefits are immense, but Internet gives us a number of other benefits. We can move into new and emerging markets very quickly. Our sales force is able to respond to customer requirements more quickly. Corporate knowledge capture has indeed become a reality with us. Moreover it is probably no coincidence the BT has won the European quality award for each of the last three years—in fact, the largest company ever to do so.

Now turning to financial and information management, that is critical to our success. But last year our paper-based handling system processed one million vendor invoices, six billion pounds of payment, and nearly two hundred thousand purchase orders. As we all know, operating this sort of

manual process is hugely time-consuming expensive. So we're in the process of implementing an e-business solution through a suite of solutions, called e-payables—e-expenses, e-overtime, e-pay slips, e-requisitioning, e-receipting, e-invoicing, e-certification, e-inquiry. That's an awful lot of E's in that program. But that's designed to improve efficiency, take twenty percent out of our computing costs, twenty percent our staff costs.

So will e-commerce be most widely used? Although the media speculation is concentrated on e-commerce in the individual market, we are seeing the acceptance to a far greater extent in the business to business market. According to such respected analysts as the Forester Group, the business to business market will continue to dominate for the foreseeable future. Estimating in nearly 2003, the e-commerce market place will represent 1.4 trillion dollars worth of goods and services, but of that approximately 1.2 trillion out of the 1.4 trillion will be business to business.

Technology developers, entrepreneurs have led the initial charge. These groups have the great assets of speed and agility as well as the freedom to risk relatively small amounts of capital and to explore unorthodox business models. They have the luxury of being able to address niche and emerging markets and initially at least they are really not subject to the shareholder oversight and the regulatory reporting obligations of a publicly traded company. These freedoms, however, are accompanied by a series of limitations in reaching the broader markets. Limited capitalization restricts the scale of deployment. New companies deploying initial services must cultivate customers from scratch, with the attendant high marketing costs. Startups have to struggle to develop and leverage a brand identity in a crowded and very competitive field. The same attributes that enable these pioneering companies to do so actually restrict their ability to take hold of the larger market place. Their assets can become, in fact, a liability.

In fact, I think we're now probably entering the second wave of online commerce. Characterized by broad adoption by consumers and particularly business. Second wave technologies and applications will be characterized by ubiquity and transparency. They will in other words be available anywhere with standardized interfaces. E-commerce is moving out of the science project phase and becoming part of the invisible infrastructure of business. Now while no one has become truly accepted when we do not notice its existence, when its use is as instinctive as the telephone, the fax, and the personal computer, it is, however, scale rather than complexity that

presents the greatest stumbling block. The industry is only now learning to deploy data services on a global scale, striving for the levels of reliability and performance customers have grown to expect from traditional telephony. The fact the two of the industry's most accomplished service providers have suffered wide-spread and sustained outages are testament to that immaturity by standards set by voice telephony. The fact that these outages were carried as news items throughout the world is testament to the huge importance that all the global carriers have in the day-to-day life of business.

But there are still a few important pieces missing. Widely recognized standards for the exchange of information processing and transactions are slowly forming, but we're still a long way from reaching universal technical standardization. Global availability of carrier-grade services, IP transport services, high-end data centers, access to high-speed communications, and ultra reliable hosting facilities is far from ubiquitous outside North America and Western Europe. In many countries, there's still only one local service provider with one low bandwidth connection to the global Internet. The well-known global hosting companies have today concentrated their activities in North America, Western Europe, and Japan. And there are some issues. Language. The frontiers of the Internet seem abandoned until you realize it's dominated by English. There are currency exchange issues, taxation issues, and other regulatory compliance issues. But the essential attributes of a truly global service provider will be ubiquity of the global footprint, scale, capability to manage immense traffic loads, and regional and local commercial relationships. Now these areas are the natural competencies of the global service providers. And the global carriers to date? Well we've been the stewards of the standards, stewards the development, stressing interoperability and reliability. To truly succeed in a variety of geographies around the world, it's essential to have a local face and feel. The French tend to buy from the French, the Japanese from the Japanese, and so on. I believe it's a multi local global service model that will emerge over time. And we in this and to achieve this at BT we partner. We can't possibly understand the nuances of all local markets. We participate with the best possible partners. Each partner brings a unique understanding of the market, its commercial and regulatory environment, and its customers. And in return, they're backed by a world leading global communications company.

So what are the factors likely to shape the e-commerce industry in the future? Customer ownership is still going to be key to success. The first principle of marketing has not been displaced by Internet technology. Customer ownership is still key to that success and this is driving BT's global philosophy. Retailers are the natural owners of the individual consumers and hence of the business to consumer e-commerce. The most successful online merchants like the most successful traditional retailers derived their most profitable revenues from loyal repeat customers. They cultivate these customers through traditional methods: marketing a brand to attract them initially and personalizing service to retain them. These companies are able to establish these positions so quickly, because the e-commerce model is based so closely on the traditional retailing and distribution model. So e-commerce has just become another channel.

The global communications service providers are the natural owners of the business customers. The challenge for us is to develop a ubiquitous, reliable, standardized platform to enable our customers and partners to leverage themselves worldwide. This platform, comprised of high-speed connectivity, carrier-grade Web and application hosting centers, and ultra reliable core business applications will link the world regions by a truly seamless global marketplace. As e-commerce matures through converging technical standards the emergence of enduring business models and the establishment of global commercial alliances, it will be the global communications providers who will deliver the reach and reliability to keep the promise of e-commerce.

Business issues and not technology issues will govern the pace of e-commerce adoption. As e-commerce matures technology, it reaches further and further back into the product cycle, reaching back through the simple order fulfillment to inventory management, from inventory to manufacturing, from manufacturing to the supply chain, to vendor management, and ultimately allowing an individual customer order to directly control its own manufacture and delivery. This potential for mass customization has enormous implications in e-company, making sales, marketing, manufacturing, engineering, and the entire supply chain on a per customer or even per order basis. It may even lead to people-free factory. In fact in BT, we're getting close to the people-free local exchange. It's now supposedly run by a man and a dog: the man to feed the dog, the dog to stop the man touching the equipment.

Now the rewards for getting it right are substantial in the form of efficiency, reduction of costs, and customer satisfaction. I must commend such companies and Mack and Ford for having shown us the way.

So what does this mean for all of us in the room? The e-poch ideas have arrived; we're essential to their fulfillment. So what the changes likely to be? Well who am I to predict? After all, I'm not Lord Calvin. But they will cause changes that are fundamental and changes that may be obvious only to our children.

Thank you very much for listening and I would now be delighted to take questions from the floor.

## DAY TWO: (MORNING): SEPTEMBER 14

## SESSION II

## "Intra-Regional Networks: Solving the Costly Backhaul Dilemma"

**Presenters:**

**William Carter**
**Marc Dandelot**
**Bill Pearson**

## William Carter, President and Chief Executive Officer, Global Crossing Development, USA

Thanks Joe. I appreciate that. Your ships are doing quite well, I think. Utilization is about eighty percent, so they're always at sea and doing very well.

It's difficult to move from e-tailing and e-commerce to e-backhaul, but we'll try to make this as little mundane as possible in talking about those facilities and structures and what going to happen to them. I going to spend the next few minutes probably talking about definition and history of backhaul just to give some groundwork; talking about some price trends, and talk about Global Crossing strategy in connection with backhaul and intra region networks. Then given you at least my opinion on some trends and where we're trying to get to.

Let me start, if I can, with some definitions about backhaul. Backhaul is the connection between an undersea cable and a city or cities throughout a region and consequently an intra region network for the backhaul. Backhaul wasn't around five years ago. It's a new term. And it wasn't around five years ago because we had such things as interconnect, we had few carriers, we had applications and technology and those carriers dealt in half-new world and the voice world and voice was king. Backhaul was replaced at those times or was really a thing called tailed circuits, an interconnection, if you had more than one carrier. Today's environment has changed quite a bit. But it's a very recent term in terms of what backhaul is and its coming about. If you take a look at, for instances, the environment that we're dealing with--and this has been going over in many of the discussions we had yesterday and still a continuing topic--the things that have changed the backhaul arena have been one, the regulatory environment. The regulatory environment and lots of new carriers and lots competitors coming have really forced the backhaul into many, many more choices to get from cable to cities within regions. Competition has increased and the prices have gone down and carriers requiring end-to-end service and end-to-end connectivity and that's made all the difference in the world. The affects on backhaul have really been greater access and greater choices. In the last few months, we've moved from leases to IRUs in backhaul and the bandwidth has gone up considerably.

If you looked at that deregulation around the world, it comes as no surprise that the Americas and Europe have seen a tremendous increase in the number of competitors and the number of carriers and that's driven the backhaul prices down. But even in the Asia regions, the competition is picking up. Africa hasn't moved at all yet over the last five years, but it will be in the future. South America is moving there now. But this deregulation and liberalization is one of the tremendous causes in terms of what's happening in backhaul and that backhaul is changing daily as we speak.

If we looked at the old world when voice was king, there are certain backhaul situations that interconnect activities that really brought about a lot of different things. We used to bulk our capacity on the cables, but when we got to the cable station and those tail circuits took effect, there was really small bandwidth and spacing out to very many cities throughout countries and regions that the real bulk capacity was between cable stations.

Reminds me of an outfit called Ralph's Grocery Stores in Los Angeles and California. In don't know how many of you are familiar with that, but they've been around for like a hundred and fifty years. These were the guys that sold Dan Petra shovels way back when. They made a lot of money, but there were also real innovators in terms of how they did business and how they controlled or got ride of the controls in terms of supermarkets. Back a hundred and fifty years ago when they were selling shovels, you used to walk into a grocery store and you would had the clerk behind the counter a list of what you wanted. And then he go get it for you. Very similar to the backhaul situation interconnection activity that was going on years ago between carriers and monopoly environments. It all changed with Ralph's, though. Ralph, about a hundred years ago, decided to get rid the counters, get rid of the clerks, and they wheels on orange crates; they invented the first supermarket roller, where the customers could go get their own groceries. They found out that when people did that they bought more than what was on their list—a very exciting environment.

The second innovation that Ralph's came up with was that they found out that people stopped buying when the grocery carts got full. When it gets full people go to the counter, they pay for it, and they leave. So the second innovation that Ralph came up with was that they made the grocery cart bigger. And if you go to Ralph's in California, the grocery carts are a lot like tanks. You have to hold them like this. You don't go down hill with them because they'll get away from you. But they found out the bigger you

made them, the bigger and more groceries that they sold. Well the same thing has been true with backhaul too. In the arena that we're talking about now, as everybody mentioned, the data's taking over. We're more than eighty percent data and about twenty percent voice in the network and that's caused tremendous bandwidth increases. Bandwidth increases not just on the cable, but stretching out to the cities. We're now talking about wave lengths that we're selling to customers. Wave lengths and networks and those networks are not only extending to the cities, but they're extending all the way into locations, all the way into customer locations. So backhaul is become an evolving thing, an evolving thing from getting from a cable station to a city, from now getting to cable station all the way to customer premise.

Price trends across the Atlantic, I think as everybody knows, have been going down tremendously. With [unintelligible] eight it was about six hundred forty thousand dollars. It's now thirty-two divided by a factor of twenty is what's been happening to the prices across the Atlantic. It probably comes as no surprise that the same arena has been happening, but a lot less time, in terms of the backhaul in combination with those facilities. If you went back to 96 it's about sixty-five million dollars extrapolated in terms what backhaul, plus the cable facility across the Atlantic would have cost. We're now trending down to eleven to six to—and we'll keep on going in that kind of direction. Backhaul is been decreasing tremendously in terms of the proportion of the total circuit end-to-end, city-to-city.

Global Crossing's strategy is as we move from a regulatory environment or heavily regulated environment to a non-regulated environment is we tend move our strategy in terms access, In a heavily regulated environment, we will buy from the incumbent carrier. In a non-regulated environment, we'll probably construct our own. And in between that, when you run into Central American countries or Japan, we will have venture with somebody else who has to be there in terms of what the regulatory controls and devices make us do.

To give you some examples about what Global Crossing did and how examples fit with that strategy. In Europe with deregulation, initially we came before deregulation into Europe in January 1998 and we used Germany and the Netherlands, but we built our own facilities and ordered our facilities from carriers within England. Over the course of time and deregulation, we are now constructing throughout the entire region. So now

have a Pan-European network that gives us backhaul, if you will, or an intra-region network, throughout Europe. We're currently into thirteen cities this year. We'll be expanding that to eighteen and then to twenty-four and you can see by the white dots on this chart that we've got some other cities we're currently evaluating also. But the backhaul means getting from that cable station to cities and premises where customers want to go.

Other examples, in Japan we have a joint venture with Marubeni, so there's more control, more regulatory environment. In that particular situation we have a forty-nine percent interest and Marubeni has a fifty-one percent interest. In our Global Access Limited within Japan to get backhaul into Osaka, Nagoya, and Tokyo.

Very similar in Mexico, we have a joint-venture with Bestel to get us to the major cities—Tijuana, Mazatlan, Mexico City, etc. In the United States, though, it's a different matter altogether. The United States is the most extensive intra-region network we've got to have in terms of getting to all the cities in the United States, the roughly eighty cities in the top one hundred cities in terms of communications in the United States. So it's very important in terms of the connectivity of the worldwide network to get into those cities. Consequent reaction in that particular case was we took off in terms of an acquisition that we're going through with Frontier. That gets us to one hundred and twenty cities throughout the United States and completes our network worldwide. So we've got eighty-five cities internationally outside of the United States and one hundred and twenty back in the United States.

The issue though really is not backhaul. It's like yesterday several of the speakers talked about customers don't want to hear about products, they don't want to hear about technology, they want to hear about their services and applications that they can get. I think the same in true of our customers. Customers don't really care about backhaul. What they care about is the city-to-city, premise-to-premise connection. They want to be told and how the parts are going to be made. What they want is the end-service and end-to-end point ability. There are even customers today that don't even know what backhaul is and that's probably a good sign.

In terms of our infrastructure strategy and where we're moving, we're moving and have evolved from the standpoint of starting out with a cable-to-cable station situation. We found out customers were not on the beach they

were really in the cities. We had to get there, so we changed to a city-to-city and started buying backhaul. That was really the evolution of backhaul as it came to be known. Now we're going building-to-building. Annunziata [CEO of Global Crossing] has already announced that we're moving into major customer locations and in terms of those major customer locations where they need to in huge bandwidth from one premise to another premise, then we'll make that happen for them.

So, in terms of market trends, in terms of the strategies and what I think, in my opinion, of where we're going: first of all, backhaul prices are going to continue to fall. They will to continue to slide down that slope and it will become a commodity. But backhaul will also be included in the capacity purchase not as a separate entity, but as a part of the end-to-end circuit.

The technology developments are going to change. Right now KDD and Lucent are working on repeater situations where there's not a distinction between terrestrial and undersea environments. That's going to change from a technological standpoint and continue to drive the prices and availabilities and features and functions even greater in terms of backhaul.

We're also going to see a current trend, as I mentioned, from building-to-building instead of city-to-city. So the extensions of backhaul, the extensions of the intra-region networks to make that end-to-end work will continue.

So in terms of summary, I see a complete evolution in terms of an evolving situation with backhaul. It will continue to evolve, it will continue to evolve as quickly as it has evolved over the last two years.

Thank you very much.

## Marc Dandelot, Executive Vice President, France Telecom, France

Thank you, Mr. Chairman.

One of my favorite scenes within the French theater is a scene from Moliere's play, Le Bourgeois Gentilhomme [The Would-Be Gentleman], when the middle class gentleman is attending a course from his professor of literature and he learns that man can speak in two ways: in verses or in prose. He is suddenly astonished that he has been able to speak in prose for years without knowing it. I mention this story because today I am realizing that for years I have been suffering the backhaul dilemma without knowing it. Now I feel much relieved. Knowing that, I will try to give you very shortly, in about a few minutes, some message from France Telecom experience, which may help us to discuss this issue.

First of all, I must say that the image of France Telecom most of you still have is one of this very special species that we call incumbents. And we are proud of being this kind of old specie. The truth is, today, France Telecom is also a company who is developing its business in many parts of the world as a newcomer, as a challenger of the existing incumbents. So I don't know whether we are a kind of mutant or Janus, but most of our issues of today for our future are similar to the issues that those with us on this tribune [platform] share. So think it's a kind of balance and in terms of the concern and priorities.

What I should say to begin with is that concerning the global service provisioning, France Telecom has learned a lot from its recent experience. It helped us to know that global services are not the universal cure. We've learned that even with the best network, global network, deployed, global service business is from an operational and financial point of view quite challenging.

Let me just give you one detail from our experience from Global One. I'm sure most of you have in mind the negative image of Global One that has been reported through the press because of the financial performance of the company. Nevertheless, our experience with Global One is still that a new and innovative global telecom vision is achievable. But from this experience it is true to say that one of the major obstacles Global One has

faced is in its development has been the cost of domestic and local access. And just if you can keep in mind that more than seventy percent of network cost of Global One, as global worldwide service provider, has been and is still domestic and local cost. We have also learned that among access and termination is still complex, slow to implement, scale and costly. Therefore, customer access, local presence, in terms of operation, customer proximity and access facilities in many areas are key factors for success for global services and intra-regional services.

Of course, if we talk about regional networks for us Europe is the most important example and area for the concept of regional networks. I'm not saying that Europe is the end of the world for us. We still have the global perspective, but Europe is the most important first [unintelligible], because first it is there where our revenue comes from. Still today if you take a company like France Telecom, roughly seventy percent of the revenue and traffic come from this big region. So we tend to consider in the vision of out international development we have global worldwide perspective, but we have in mind that if you look at where your revenue comes from you have first to concentrate on Europe--Europe being considered today as an extension of our home market, in the perspective of Europe being in the future a kind of single market and single political community.

But today what is amazing for us if you have in mind this concept of European Union and single currency, and if you consider Europe as your market, it's amazing how Europe is still fragmented, fragmented for many basic reasons. One of them being that the traditional incumbents are still running their intra-European business under the old model and also because although lots of progress has been European modernization, today Europe is still a very fragmented puzzle in terms of regulatory environment. It's partly because there has been kind of doctrinal choices that regulatory issues would be dealt at the national level. [**No sound on the tape here for a very brief period.**] Compared to the US, you know that frequency of location in Europe is still a national and not a continental issue. So that mobile licenses on a national basis with all the consequence is the structure of the industry of mobile business. Anyway, in spite of all these barriers and obstacles, we clearly have very strong European perspective in our European development and I will comment a little about it. One of our major objectives is to develop our business in all the market segments in European countries, both in terms of access, long distance, ISP today too, and of course having that connected with what we call European backbone network, backbone being

backbone connecting key areas regardless of the formal political limits between the countries. What we call a backbone, of course, is high-capacity backbone connecting cities or metropolitan areas where the traffic comes from. When I prepared my speech, I quoted that around a dozen European backbones have been announced by various telecommunication operators, but before coming to this tribune [rostrum], I doubled checked and the right figures may be thirty-one. So of course, this raises a question whether there will be a place for all these projects. At least we tend to believe, we're optimistic that our backbone economically consistent, but that will be because at the same time we have developed strong local presence in most of the European markets. So the situation of today is that with this backbone we should connect around forty points of presence in Europe, including eighteen countries. Of course, it will secure access to high-speed capacity at low cost and, of course, we consider that it makes sense because we have a goal at the same time to stress our one global capacity outside Europe through the North Atlantic connection.

So for us, the point I wanted to stress from this tribune [rostrum] is that we have four key factors of success for our European development. One is our preexisting customer base. Second is our local presence. Third is quality of service. Fourth is [unintelligible] and global connectivity. So I fully support the argument that has been expressed on this tribune [rostrum] already, I think several times, that if you want to be global you have to local.

Is there a risk of excess of capacity in Europe? I think this is a question you are interested in and I think this is a very difficult question, because the answer is 'I don't know.' The only comment I can make is that until now actual traffic has always exceeded forecasts. And I remember working years ago with somebody all of you know very well, a great friend of Intelevent, Jean Grenier, and I remember having debates six to ten years ago about capacity of transatlantic cable and people wondering whether we were not laying in the ocean huge amounts of circuit overcapacity. And so we know what has been the story so far. So I think in that perspective, we can be relatively confident. Although, I think that obviously, and it's not necessarily in contradiction with this optimistic view, there still may be too many players, even if there is not too much capacity.

There is one very uncertain point, which is what will be the real residential demand for worldwide access. We all expect this will be one of the driving forces in the long term development of our business, but I must admit that

this is a very, very big question mark in the future. This is partly one of the reasons why we decided, as a very early strategic move, to invest in a UK company, you all know NTL, because it was very well placed to face this very big question for the future. I think that is today a very important question.

So we do not view the economic viability and sustainability of a backbone as an issue per se. But more important, if I have a message to deliver in conclusion, we think we have to reconcile an industry which combines the business unit and decentralized business unit, decentralized close to the customer, close to the market, while fueling the network with captured traffic and because it is very important—because network and traffic is one thing, but in the end even traffic must generate revenue. So you must keep the financial approach procuring for the value sectors the appropriate return on your investment.

Thank you for your attention.

## Bill Pearson, President and Chief Operating Officer, CompleTel LLC, France

Thank you, Mr. Chairman and thank you Intelevent for allowing CompleTel to be here today to share with you our story.

We're a Pan-European privately held CLEC [Competitive Local Exchange Carrier] and I suspect before we go our IPO we're going to be a Pan-European ELEC to taken on the suggestions of today. I want to apologize for two things: I want to apologize for—if you accidentally see that some of the things I'm going to talk about here appear to be a sales pitch for our company, they're not. And I would also like to apologize for being so tall you can't see that see the slides behind me anyway.

As Joe suggested, for the last ten years I really have done nothing but look at local loop opportunities, different access methodologies in a wide variety of continents, starting with TeleWest, what became TeleWest in the UK. About two years ago we got skeptically comfortable that the continent was really going to liberalize around the EC directives and decided that it was important for us to be aggressive if we were going to take some positions around Europe. So for the last two, we've been going hard at building this company I'll describe to you and the strategy that we see. The agenda may say that we are either a US company or a Belgium company, but frankly we small office in Denver, but our main headquarters is in Paris where I'm located.

I'll talk quickly about a little background of the company, talk very, very quickly about financial trends, and spend most of the ten minutes here talking about how we see Europe, how we see the strategies, how we fit in, and then summary and conclusions.

We privately held by Madison Dearborn Partners, the primary investor. They own about two-thirds. They are a three and a half billion dollar fund that also invests in Allegiance [Telecom] and Focal [Communications], two of the very successful CLECs. This is their first international deal and [it] has been very good. As you know, your first international investment is a bit scary and they're doing a great job. About a third is owned by LPO investments, private individuals [unintelligible] to George who is on the UIH and UPC board and has a lot of international experience.

We've added a couple of people to the board. Two of the godfathers of the US CLEC business: Royce Holland, who started MFS and now runs Allegiance, and Jim Allen, who started Brooks and he is now on the WorldCom board and MetroNet. They will provide us a great deal of value bring us some of the best education, some of the best learning from the US to help us figure out what works in our markets in Europe.

Our philosophy is we are nationals in each country. In France, we're French. I'm semi-disappointed that we have France Telecom here, because we're trying to keep a low profile in the countries we're serving currently. In France, we're French. It's run by Jean d'Vetre, who comes from Alcatel. We have about two hundred employees there building in seven markets. In Germany, it's run by Yorg Retter. We have about thirty people in Germany, all Germans except a few Austrians we let pretend that they're Germans, who come to us from Colt. In the UK, we bought an Internet company that run by a guy named Martin Rush. So we understand there's value in bringing stuff from the US, but there's great value in most of the national constituencies of being a national company—whether it's the regulator or the customers or a wide variety of constituencies. So other than few of us expats [expatriates], there's very, very few people who speak our kind of English.

We've been very lucky in Europe. There's a mythology that there is not a lot of entrepreneurs in Europe. And if that's true, we got very lucky, because we have an extraordinary group of people. We tapped into a bunch of good entrepreneurial, yet frustrated people from companies like … and a bunch of related industries. So we have wonderful, wonderful management teams in each of the countries blended with a little bit of US experience.

We have some funding. Enough to get us moving in the twelve markets that we're in. We have a huge, insatiable appetite for additional capital, because we see enormous opportunities in the local loop strategies that we're pursuing. That's all I do is to continue to raise money.

We're going extraordinarily fast. Way faster than we thought in our plan. There's a lot questions about how do you get rights of way and how to go through—especially those people here who are Americans, who haven't gone through some of vagaries of Europe—we've had an extraordinary good time getting rights of way, building networks. Most of the cities, especially

the smaller cities, really like having new entrants come in. They like us for a couple of reasons. We create a lot of jobs, good paying jobs, both directly and indirectly, which is a very big deal in France and Germany. We give them an infrastructure that lets their chamber of commerce compete for new businesses.

Let me give you a little background, again, for those of you I apologize if you're way up to speed on Europe, but for us the European opportunity is simply—you can see the big play by just a couple things. First of all, Europe telecoms [market] is almost as big as the US and it's growing faster. If you put it in context, for example, [unintelligible] it's fourteen times the size of Canada. So it's a huge market and it just opened up. There was a 1996 directive from the EC that [said that] each member must have implemented. And there are variations on the theme, which are very important to understand. Each country is implementing it in its own. Up until now, there's been a lot of talk about unbundled access. There are a few places you can do it, but early on here one of the primary differences between the US and Europe is the current inability to access the unbundled local loop, which really reinforces infrastructure. It says, in essence, you can resell long distance or you can build local loop, because we don't really want you to resell the local loop. They're working through that, but up until now it really reinforces infrastructure development.

So when you combine the fact that the market is a huge size, the continent has just liberalized, and there's not a lot of competition in a lot of the sectors—you put those together and you see great opportunities. We've decided we want to be in ELEC or CLEC. I think from a distance it is very difficult to understand who's doing what, because there's an enormous amount of noise. It seems like every company is everywhere. Everybody's announcing that they're doing everything in all these markets. But as you get underneath that, we have found that really the only alternatives in the places that we pursue our business is really the state-run PTT. When we go into customers it's either France Telecom or Deutsche Telekom—in the vast, vast majority of situations.

In Europe, it is a little different in terms of identifying where the good business concentrations [are], with an absence of competition. A little bit easier in the US, because you can drive around and see the high rises. In Europe, other than a few isolated areas, everything is six stories. So you can't drive around and build your network. You've got to do a lot geo-

marketing. So we spent a great deal of time trying to identify where are the good concentrations.

The way we see Europe is that there is a lot of good opportunities in a lot of segments. When you start from with one end with Global Crossing, transatlantic circuits are great. There's a bunch of companies building Pan-European circuits. Thirty-one may not survive, but certainly there's great opportunity there. There's a number of companies building intercity links within a country, doing a national network. There are people doing a lot of resale. There are Internet orientations. There's mobility. But one of the places where people have not really focused—it's one of the more difficult places—is the last mile, the local loop, because currently you have to invest. And it a lot of investment and it goes slow and it's street by street. But we think that's the best strategy for us. We think it's the most sustainable business, we think it's the most differentiated assets, and we're the closest to the customers. So we are about local loop. We want to be multiple countries, which we are, but we really are focused on the local loop.

I'll take you through a little bit about how we see the various markets in terms of how we determine our portfolio. Speed to market is important for us. Obviously, management teams enable the whole strategy, defining which services we want to be in. Our network strategy has to be robust enough where we can take advantage of DSL, be positioned for wireless, have enough bandwidth and capability to going against like Metro Media, if they want to come in, and move to dark fiber if the business moves that way. It's very robust and very defensible.

When we picked our countries and then our markets, one of the things that is interesting to note for those people who are new to Europe is other than the US and Japan, Germany, the UK, and France are the three largest telephone companies in the world, the largest telephone markets in the world. Big is better, when the market opens up. The size of the markets was very compelling for us. The enabler for all international business, indeed all domestic US business, though, is the regulatory and political regime. It determines the terms of competition, the available margins, the rights and responsibilities of various players, absolutely critical in determining whether an infrastructure investment makes sense, because you need some stability and some forward views there. The competitive landscape is the second most important; we try to identify good areas where there really are not any other players. And then there's the market size and density. What we've

decided to do is have multiple countries as a strategy, so we mitigate some of the country risk associated with individual regulatory decisions and competitive reactions. And also, there are just so many good opportunities. We're primarily building in France and Germany. We like the mix of major markets and smaller markets. From a distance, it looks like London is totally full of competition, and indeed Paris is full of competition, but when you get underneath that and you get into geo-marketing, you realize … that there are a bunch of geographic areas where there isn't anybody. So we like major markets and we like being aggressive in what in the US we'd call second-tier markets.

One of the important characteristics for use, which is subject of the question today, is that we're ahead of a number other players that might be thinking about it and we want to stay aggressive. We don't know how many players are sustainable, but we know we want to be first, and we want to keep our lead. So that's our defensive strategy. We're doing a great deal just to stay out in front of others who are thinking about doing what we're doing.

In terms of customer strategies, we have a duel approach. We have a very aggressive retail approach, where retail sales people, direct-sales people will sell every customer on-net. We have a wholesale carrier business that is really doing a great job, going after this huge, huge carrier business that's emerging in Europe. As all these thirty-one Pan-European carriers are building their networks, a lot of them don't have time or money to build the local loops. So they're wonderful customers for us to provide wholesale special access, dedicated access. So we're positioning, both on the retail and wholesale basis. We're taking share from traditional services—traditional voice, traditional data—and really position ourselves for the evolution from SDH to IP and moving into the Internet related applications.

With our network strategy, we put in a minimum of one hundred and forty-four fibers in the backbone, with extra conduit and extra ducts. We have tones and tones of capability there. In our business plan, we don't assume wireless and we don't assume DSL, those are both upsides to the plan. We think the most enabling component of that strategy is to get the backbone in, which is what we're doing. So we think that's the key anchor of our deployment strategy.

This is just a little description of the work of we do to find to build these assets, because if I just tried to describe what we're trying to do in one

phrase, it would be the title of this slide: to be an aggressive and intelligent asset deployment [company] is really what we're all about. We have grand aspirations. Currently, we're in three countries and operating in twelve markets. We'd like to be four times that size in two years, which is the data point relative to this insatiable need for capital. We see good opportunities in a lot of places.

Very quickly, this is just how we're launching. It's not simultaneous, they're staggered by a couple of weeks here. We're building in eleven markets: four in Germany and seven in France. All will be launched in within the first quarter of next year. We've completed the network design for the next [unidentified: sounds like "trausha"] markets and things are going well. I don't what to belabor you with our operations. Our operations have gone extraordinarily will in our first half-year here. For example, our route kilometers, our plan that we had for our high-yield [unintelligible] suggested we'd have three kilometers by July. We assumed we'd have a lot of trouble getting rights of way and we're well over a hundred at this point. Revenue is similarly going much better than planned. IT is one of those big things you learn early. The first CLEC you do, the first switched CLEC you do you learn that billing kills you if you don't do it right. If you miss a bill a cycle or a bunch of unrateable call records, you're … not going to catch up for the year …. We learned that at TeleWest, painfully we learned that at TeleWest. So we spent a great deal of money; we put thirteen million dollars in a bunch of back-office systems way before a company our size should do that, because we wanted to have the platform and it's gone very well to have a common European platform running bill cycles. So we've got all that back office stuff, at least for the on-net business ready to go. Now as we move towards DSL, as that opens up, we're taking a lot of lessons from Royce Holland on what are the dos and don'ts of provisioning, which is and will be a huge headache in Europe.

Nothing here. Sales are going great. We bought a couple of ISPs. I think to Alfred's point, earlier today, we are buying them as much for the human resources and the skills. You can't go out and get really good Internet people very easily, so we've acquired a couple of companies because we love the management team and we've worked hard to keep them motivated. It is painful to integrate them into a SDH environment, so we're kicking and screaming a little on that. The obvious synergies in the IP business is going to suggest we continue acquire Internet companies.

We've got pipeline of sales. One of the questions in Europe, indeed in every country, is: are our consumers the same or different than other countries? The universal joke is every country thinks they're unique, but from a distance they behave, certainly in terms of industrial buying behavior, the same. So the data point here is just in France customers behave life normal customers. They want buy quality and service and improved billing and save money and have vendor diversity, so they improve perception of reliability and diversity. In Germany, we're going very fast there. German people, a substantial percentage come from Colt, surprisingly, are going as fast as they can to catch up to the French group, probably won't make it until mid-next year. We've done a lot of things and we're really kind of managing the milestones in that business—kind of setting ourselves up for fourth quarter and first quarter launches in our four markets there. Leveraging the IT systems and some of the management tools we had developed in France.

This is the sales pitch, the worst sales pitch slide. We think the market is great. Competitive and regulatory environment is perfect for what we're doing. We've got good backing. I don't think we have the best management team in Europe—I think we have the TWO best management teams in Europe actually. We've got a very focused local strategy and customer-driven deployment. We've thought a lot about how we develop and deploy and continue the robustness of the network and the IT strategies—and it's going really well!

And that's it for me. Thank you.

# DAY TWO: (AFTERNOON): SEPTEMBER 14

## SESSION III

## "Internet e-commerce"

**Presenters:**

**Pat Chapman Pincher**
**Samir Naji**

## Pat Chapman Pincher, Senior Vice President, International, UUNET International, United Kingdom

Thank you, Andy. Good morning, ladies and gentlemen. It's always a bit distressing as supposedly the first speaker on a subject to discover that all the other speakers have already covered it. But I will, however, do my best. I think it's a tribute to the interest that we suddenly have in e-commerce that's its become such topic for every speaker.

I wanted to change the angle slightly and talk not about e-commerce, but about e-business, of which, I think, e-commerce is really a subsection. E-business, I regard, is something, which is using the ubiquitous IP network, which is growing so rapidly around the world, to totally transform the way that we do business, to totally transform the way that we live our lives. Alfred Mockett likened it this morning to the advent of the motor car. I think he's right. It's a totally transforming technology. He said that we were in the middle of a revolution. I don't think we're in the middle of a revolution at all. I think we're right at the beginning of a revolution. We're roughly in the same stage, in my view, as we were in the days when the motor car first invented and the UK government to protect its citizens brought in legislation which said that every motor car had to have a man with a red flag walking in front of it to protect the passers-by. I think that's almost where we are. What we're seeing is something that will totally rework the value chain, totally rework business, as we know it, and rework the global economy—and do all these things in ways that are completely unforeseen. I think at the moment we are tending to predict from our own knowledge, as no doubt the government did with the motorcar. And it transforms us from an analog to a digital business economy. For many of us who have been in this industry as I have for thirty years, I think we feel that we've been in a digital economy for a long time, but we haven't. We're just moving into it. And it's a journey, this is not an event; it's going be a long, long very exciting and very fraught journey—and one, interestingly, where those who do not have the benefit of a lot of luggage may do better than many of us with long telco pasts.

Why are we going down this route? Well, because for the simple reason that any business change happens it gives people competitive advantage. It allows us to drive lower costs, higher customer satisfaction, neither of which we've really learned to do well yet. And it allows people who currently

cannot compete in a global economy to be suddenly competitive in a totally new world.

I spoke at a conference a couple of weeks ago to African telecoms and Internets business leaders. One of them told this wonderful story of this man who sat in an African country and what he did was every week he made a chess set, very beautifully, by hand, hand-carved. He used to sell one of this a week. Somebody suggested to him that he went on the web. During the first week, he received orders for five thousand chess sets. It has transformed his life—probably in a way that he didn't entirely foresee.

E-commerce, I think, which is a subset of e-business, is about doing business electronically. It's about the business-to-business market, the business-to-consumer market. The sorts of things we know and love with Amazon, retail banking, and retail buying of shares. But, again, only just in its infancy—a long, long to go. I spoke at breakfast this morning to a wonderful man who's got a business idea, which is essentially setting up a lending library on the net. Brilliant, I thought. And what's it's doing is driving all sorts of new business opportunities that we haven't yet thought of: infrastructure services, trusted third parties, the whole security area which is going to absolutely critical to how we get e-commerce, e-business off the ground.

This is one of those wonderful [unintelligible] to the right charts. The thing I love about these is that they are consistently wrong. They consistently underrated. If you go back to people who forecast markets, they never seem to get them right. The wonderful thing about the Internet and the e-commerce markets is that they are consistently downside in the way they're forecasting. I think for those of us in the business, it's a very exciting future, if we can all keep up and if we've got enough energy to do it.

What's new about e-business? Those of us who have been in the business for a long while, it has been around for years: we used to call it EDI. Well, I think, what's new is the Internet. The Internet has actually changed the whole approach that we can take to doing business electronically. Firstly, it's ubiquitous. It's not totally ubiquitous, there are places on earth where the Internet doesn't reach yet, but for those of you who have children that go off backpacking, you'd be amazed at the places they can send you e-mail from. And it's cheap. And it's easy. Although the user interfaces need a lot doing to them, it's still fairly easy to get your business up and running on the

Internet; it's a comparatively low cost; the barriers to entry a very low. What is more, it's a genuine global environment. It's going to allow genuine global competition. It's going to allow the guy who sat at the gates of one of the national parks in Africa making his chess sets to suddenly sell them in worldwide market.

I think the Internet itself has gone from being a novelty to becoming a necessity in our lives. Hands up anyone in the room that could not survive without e-mail—and I don't think a single hand will move. But, again, it's not yet a necessity to businesses. It's extremely important, but it's not yet become business critical. I think over the coming years we're going to see moves to true business criticality for the Internet. To business that really don't exist in any other place, but connects everyone that works for them over the Internet that have no necessary geographical location. When people say to me where are you based, my answer is I'm based on an airplane and in a briefcase, because that's all I need these days; I don't need an office.

If you want evidence of the success that the Internet has had, and it's a very interesting commentary on the bandwidth debate that we've just listened to, Moore's Law, which was what drove the PC industry was the fastest growth we've ever seen, it said that PC capacity doubles every eighteen months, which is why every time you buy one of the darn things it's out of date. But the Internet law says that bandwidth demand doubles every three months. We can attest to that from our own experience at UUNET. We see the growth on the network doubling every three months. If you think that the bandwidth availability is growing by eighty-seven percent a year, and somebody said to me well eighty-seven percent bandwidth growth will be fine, we'll have a bandwidth glut in no time. No we won't. We'll be in bandwidth shortage for years to come.

What's driving that is huge demand, huge demand for applications-free business. But the critical point, I think, about the growth of the Internet, the growth of e-business is that we have to build the networks that are the foundation of that business as fast as we possibly can, as well as we possibly can, and to make them a scalable as we can. There's be several speakers today talking about the importance of global networking. It's absolutely critical that we build, support, run networks on a global scale if we're going to support the e-commerce, the e-business opportunities of the future, because without that it simply doesn't work.

Then once you've put the networks in place, you can start to move up the value chain. I think we're seeing evidence of this happening. Video conferencing, audio conferencing, distributed call service centers are all evidence that we're beginning to see e-business move on to the Internet, and all bandwidth hungry applications that need global networks.

But then how do we evolve the Internet to actually take advantage of the e-commerce opportunity? We have a saying in the company that trying to sell connectivity to a businessman is like trying to sell electricity to a chef. They're simply not interested. You have to start selling solutions. We think that over the next two to three years—and this is a real challenge for those of us that come from network backgrounds—we think what we will see a move from network sales to solution sales. That customers will in the future buy e-business solutions. They won't buy networks, they won't buy connectivity, they won't buy local access—they'll buy solutions. We believe that there will be a significant shift in the market from the telcos, from the ISPs to the solutions providers actually having the market power in the future. And we see the move from the bricks and mortar enterprise to the virtual enterprise. Where the IP technology changes the views the corporations of about where people sit. I spoke to the regulator in Hong Kong who said there are two hundred thousand companies in this country—and it's very small country—some of them, in fact most of them are one-man businesses, but they all see themselves as global businesses. They are all dealing in a market, which is outside of their local market. And therefore if we're going to support global businesses, we have to have genuinely scalable global networks.

What are the things that I think are going to move onto these genuinely global networks: the virtual line of business applications, the things that support businesses at the moment, which are supported by people in offices: accounting, payroll, human resources. I'm sure we're all now at the state where we get most of our software written in India, because it's cheaper and more effective. But I think we'll also see a lot of the more human resource intensive areas of our businesses moving on to remote application-hosted providers. Business themselves will scale down to really just the core competencies of that business and everything else is outsourced. You can move that model to a point where the total knowledge management of a business is in fact outsourced, and that starts to drive huge opportunities for people that within the outsourcing arena.

The marketplace will get, I think, increasingly complex. This gives both opportunity and, of course, headaches to those of us in the business. We the traditional players the telcos, the ISPs, the cable people, the wireless people, all the people who run networks, but then on top of that a whole raft of content providers, the independent software developers, and then the application service providers—so a very, very diverse market of people working in this new business environment. We started to try and do some work on segmentation of this market within UUNET, partly looking at were played, but also looking at who are the other people that we partnering with. I think you can look some of the emerging players. There's obviously the big six, who are probably leading the charge in terms of solutions provision, but I think we'll also see very, very large numbers of specialist providers coming into that area of the market. The systems integrators, people who can take legacy systems in particular and integrate them into remote server applications. Then people providing commerce software and services, and again I think this is just a market that we're just beginning to see the very early green shoots of appearing. Then there's the hosting and connection market, the market where my own company plays, and the hardware suppliers. So, again, there's huge diversity growing in this market. I don't see any great consolidation apart from possibly in the network area, but I'm not even sure that I see consolidation there. I certainly don't agree that thirty-one networks across Europe are too much. We've been very starved on networks in Europe for years, so in my view the more the merrier—build it and we'll it up.

One of the interesting things that this chart demonstrates is the shift that we're seeing from applications that are purely tactical to adoption of applications that are totally strategic. People now beginning to move strategic applications on to the Internet. There's a long, long way to go and a lot of issues to solve, but companies now seeing this as the platform of the future that will allow them to drive different and more effective business models.

Who are the winners and losers in this market? Well, I think, there are obviously numbers of winners: to an extent they are going to be the bright technology ideas, the bright marketing ideas, the people that understand Internet technology, but also the people that can make the Internet easy to use, the can make the applications users and customer friendly, that can deliver levels of customer service, and to have what we describe as Internet IQ, the ability to deal with this new and burgeoning technology that we all

have, but also people that have the right relationships in this market. It's a constant source of research of discover to what those right relationships are. It's not going to be the number of stores. It's not going to be the size of the advertising budget. It's going to be the ability to innovate, the ability to think, the ability to find genuinely customer-friendly applications, and to find applications that customer's consider are safe and secure and that will drive their business. I think also, with homage to Andy, the lawyers are going to be great winners out of this. And they're going to be great winners because one of the issues that the Internet posses is this whole question of taxes and revenue, where sales are actually made, how you give customers the confidence that the goods they're buying are the good that they thought they bought. So I think that we will see a huge body of legislation growing around this area of the Internet.

I think there will be losers among some countries. I think there will be losers among countries that don't adopt the technology fast enough, that don't deliver a regulatory regime that, allows the Internet, that allows e-commerce to really grow. I think if you look at the way business can now shift its investment, can shift where it does business, I think there may be many governments around the world—my own government has not been too fast in coming forward to embrace the Internet, although I see we've now got a czar, which is a good thing—that may be losers. I think a lot of the smaller countries that are being very aggressive in their adoption of the Internet will be winners in this, and also there's a huge potential, I believe, if they can sort out their access and bandwidth issues, for a lot of the third world countries to really make a huge technology leap and genuinely become part of a global economy.

So I think there will be winners and there will be losers. I'm not going to make predictions about telcos, although I have my own views. I think in this audience it's far too dangerous.

Finally, I think, just in conclusion, we're just at the beginning of the new world. We are at the stage of the man with the red flag. It's something that is going to fundamentally change the way we do business. I think that's something that's very easy to say and extremely hard to imagine. It's also extremely hard to understand the speed at which this market is moving. Nobody has thought through the implications of how this is going to change our business—nobody. The only thing you can do is cling onto the board and ride the wave. I think the important thing here is the old saying: lead,

follow, or get out of the way. This change in the market is going to be so fundamental and it has the potential to make and destroy businesses and to make and destroy economies.

I finish with the UUNET engineering credo, which comes from the guys who build our networks, which is that if you're not scared, you simply don't understand.

Thank you.

## Samir Naji, Founder and CEO, Horizon Technology Group, Ireland

Michael Sheridan asked me to speak at this a couple of weeks ago. I did have a discussion with Michael saying based on the kind of people that we're speaking with at this event that we were somewhat of a small company. But as the discussion progressed and we really talked about kind of areas I focus on in running my company, it became obvious that maybe some of the information I had may be useful to the audience here, especially for some of the questions that have been posed.

Just to remind everybody, the questions that have been asked are is e-commerce the killer application of the web, is product differentiation possible, and what is the taxing authority?

I'm very much from an IT background. I started my company twelve years ago in Dublin. I'm still the majority shareholder in the company. In terms of the business that we're involved in, we have several offices across Europe. I know of several companies my size that my not be that well know who are growing very, very quickly as system integrators involved in the e-business world within the IT environment. In fact I had to change my presentation several times in the last week as I went through and stripped out three-letter acronyms that would probably take me too long to explain, in much the same way I sit and listen to teleco presentations and their three-letter acronyms that I don't understand, which as one talks about the merger of the IT and the teleco industry, the differences in terms of language that's used, the business models, and some of the views of where the future is going in terms of how we discuss business problems are very, very different. I don't think they're any more different than they were five or ten years ago.

What I do see coming out of it—and I thought it was quite interesting in terms of listening to Pat's presentation—is ISPs that straddle both worlds at the moment are certainly coming across with the same kind of messages that us as system integrators are. I was just surprised at some of the points that Pat was making how similar they would be from system integrators working in this market who are helping out ISPs and corporates in terms of delivering solutions in the e-business environment.

I have two hundred and seventy employees, about one hundred consultants, and a lot of my consultants are involved in e-business or e-planning and customer interaction software. We do about thirty or forty percent of that part of our business within the Irish market and about sixty percent of it outside the Irish market. Ireland at the moment has a lot of inward investment, not only from call centers, but the next wave we are getting is web-based e-commerce businesses and we're using some of the skill sets that we developed in those markets basically in dealing with and helping companies outside of Ireland, especially in the U.K.

One of the things that I really want to stop and define, because first of all there was an understanding that what does the term "killer application" really mean. Killer application was really first defined way back with the Apple II, which was the first ubiquitous personal computer that came out. The killer application at that time was Visicalc, which was a very basic spreadsheet. In fact in those early days when I go back you could actually go into Ford Motor Company and you could actually look at the Apple II screens and when they were turned off the lines burned on the screens would be the column lines from actual Visicalc. That developed into Lotus 123 and the IBM PC, but in terms of the ubiquitous ness of the PC in the corporate environment now, it certainly started with an application, harnessing the application and technical infrastructure the existed there. And of course that revolved budgeting. No one would dream of doing a budget these days with a spreadsheet.

The next kind of wave that or technology innovation that the term "killer application" was used related to desktop publishing and the Macintosh. The Macintosh itself was in 1988 a reasonably interesting computer with a very good user interface, but of course in terms of delivering business value to people who would be using it, that really didn't happen until Steve Jobs married it with the postscript laser printer and desktop publishing packages. Macintosh still owns about eighty percent of that market. But here we were really talking about—and I was involved in some of those businesses in the early days. One of the interesting issues was the dissolution of a desktop publishing solution with a Macintosh. It wasn't twenty percent of the cost of what then was the only solution for publishing documents, which was an optical solution mostly, run by German companies—German companies dominated seventy percent of the typesetting market—it was five percent of the cost. Not only was it five percent of the cost, but when you went and you looked at one of the traditional typesetting machines, those typesetting

machines could only really use about fifty to sixty fonts and every time you bought new fonts it would cost you several tens of thousands of dollars. With the Macintosh—and at this stage it's ubiquitous in publishing houses—you have maybe access to four or five thousand, which is digitally created, and which cost roughly about fifty dollars now.

So really, when I sat down and tried to find a definition, I think the only one I was able to come up with really when you have a technical infrastructure, one that already exists there and trying to turn that into significant business enabler. And what is a business enabler? A business enabler is one that increases your return on capital employed in terms of using it. So often replaces an existing, much more expensive, less flexible … and what I mean by expensive, it's ten times more expensive, less flexible I mean ten percent of the flexibility existing solution, where you marry the infrastructure and the application.

So let's have a look at the technical infrastructure numbers that are out there. I'm afraid I may bore you for some of this presentation. One of my obsessions in running my business is getting the right projections in terms of which business areas I invest in. So I do spend quite a bit of time not just looking at one or two stats that are out there or sources of stats. I spend my time looking at maybe ten or twenty. There's one company in the US called eStats, which have in the last year or year and a half much to my relief taken over that role for me. eStats is a company that basically correlates and accumulates different data reports from each of the Internet watchers, include those that Pat mentioned such as Forester Research, who tend to be some of the more optimistic ones, to Data Monitor, IDC, Jupiter, or any of these data research companies. I have a number of slides from e-Stats because they came out with a pretty good report during the summer. Every time we talk about the Internet one of us is going to stand up here and have a graph that is going off the scale. From [the standpoint] of the shareholder and the chief executive, one of the things I really want to sure of is how solid those projects are. I think some of the information that's come out in the last five or six years in terms of its historical veracity compared to what happening here has been, if anything, conservative. I think as Pat mentioned that numbers have been lower.

World population is expected to show 6.6 percent growth. Web users are going to grow by five hundred and forty-one percent. (Web users defined by IDC [are] people who will use the Web for at least an hour for a week.

Definitions here are very important.) The number of devices is even more, but what's interesting is one you move down it's the information that's going on the web. Where moving from about two terabytes of information in 1997 to four terabytes of information by the year 2002. If your trying to buy shares out there, one of the interesting plays—an you'll notice that in share prices—is of course storage vendors in the IT environment. They are really showing tremendous growth because we are moving to very large storage volumes. So the technical infrastructure is absolutely growing.

To just come back once again on the veracity or the accuracy of the forecasting which exists in this environment, which I know is very, very important. This is an interesting slide that really showed, for example, IDC, who is a beta and IT forecaster that I've been using for six or seven years in my business, there original actual forecast for worldwide e-commerce revenues was 26.4 billion in late 1997. There revision, which that had to do in mid-1998 for 1998 and this relates to 1998, was 41[billion] and their revision that they did for quarter one of this year was 50.

I have a rather extensive table, which decided not to show you, which actually shows each of these vendors of the marketing information vendors together with the changes in their revisions in a matrix format showing the changes. It's really, really quite staggering to see the revisions and also to look at maybe some of the ranges. The ranges are not as important as the revisions. That's a very important point when you're looking at these numbers. Yes, we may question the accuracy of some of them, but the range each one of them come up with, the difference between the lowest and the highest, is less than the revisions that come out.

Definition for e-commerce in this environment was really whereby somebody actually manages to research and complete a transaction on the Internet. It excludes, for example, those users who will research the actual solution and then pick up a phone and order it from a call center.

We mentioned earlier some of the differences between business-to-business and business-to-consumer e-commerce. One of the interesting factors is that e-Stats correlating all their information together is really predicting by the year 2003 about 87 percent of all the e-commerce action going on out there will be business-to-business. And that's very important to remember as a statement and I think it comes in quite nicely in terms of some of the statements UUNET were making, which is you really have to sit down and

look at definitions such as e-commerce in terms of whether we're talking about them in broad enough terms. Remember any transaction that occurs between different business-to-business organizations happening over the an IP network would be classified as e-commerce and that's certainly the growth and the largest part of what we see happening, even though in a business-to-consumer basis is e-Bay and Amazon. e-Bay and Amazon is the tip of the iceberg based on what I see going on with my customers, compared to what's happening on a business-to-business level in terms of large transactions going through and really with EDI being a subset of that.

So we really come to the issue of when we're looking at e-commerce and e-business and we're talking about transactions, we really have to stop and look at in a lot of cases in the business-to-consumer area what people are looking for on the Internet. One thing that comes up to whole time is information, which is a key factor in some of the purchasing out there. The kind of growth that we have in terms of on-line users worldwide predicted over the next couple of years and I've taken just IDC and Data Monitor. If you add that to the amount of information that's out there on the Internet and you do some quick sums in terms of how much people are going to be spending on-line in terms of researching information, which is 95 percent of the time, rather than buying the information, you really see how the really value add here continues to be information. The purchase is not that complex. The information and the presentation of that information to your customers and to your partners is where the real value add is. I think as we develop into more and more developed economies, one of the interesting things is the ability to find the information you want and where it is has a higher and higher affect basically on GNP per head productivity.

So while even though business-to-business is really where the action is, how big is business-to-consumer e-commerce predicted to be? This is once again from e-Stats. What we're really looking a here is an estimation of the consumer oriented direct marketing sales value out there which is about 722 billion dollars in the US. These figures are just for US. At the moment 80 percent of all e-commerce transactions worldwide are happening in the US. That's expected to fall to 50 or 60 percent over the next five or six years as the rest of the world as Europe catches up more than anything else. So if we really look at by the year 2003 we're really expecting business-to-consumer e-commerce to equal about 60 and 90 billion dollars. What we can see here is that it's going to pass consumer-oriented catalog sales—sales from infomercials, TV shopping. At the moment it's only about 8 billion dollars,

which correlates with some of the figures Forester came up with there. Still a far cry off the US the retail sales number of 2.5 trillion dollars out there. However, staring to creep up. Roper Starch is one of the analysts I use quite a bit in terms of really good information. Even of those who research the information and then decide to compare products on the Internet, only about 10 percent of them at the end of the day have made the actual purchase. In terms of defining how important the information part of what you're delivering to your partners and customers is an interesting way to track that is, of course, worldwide advertising revenue in billions of dollars. There's a direct correlation between the information you're given out to consumers and the amount of advertising dollars you can actually pull down on the other end because of that attention you're getting out there. It's really only because you're able to dissimulate among the information the kind of advertising you want. It's pretty significant. Internet spending as a percentage of the total off-line spending for worldwide advertising is expected to triple over the next three years reaching about 10 billion dollars. You'll see market leaders such as Double Click going at it very hard in the market at the moment. I haven't put any projecting going out to 2003 or 2005. When you do go out beyond the actual three to five year projections, the difference between the different market research starts to hit factors of ten. It's at that point really that I don't start using information. But extrapolating this curve out for the next 15 to 20 years is a very interesting exercise.

I mentioned awhile ago the 80 percent of the e-commerce is happening in the US and as we know at the moment even from an Internet point of view in terms of Internet users, we're talking about the US having about 44.4 percent and if you add Canada to that you're up at 50 percent of the actual worldwide Internet use. This was a very interesting graph or map to show, because the surface area of each of the countries is actually done to scale in terms of the number of Internet users. What it really does show is ... that it's a Europe and The United States position at the moment. If you move out to the year 2003, you end up with Europe moving up to about mid-thirties and Asia moving up to about the twenties, with Asia really becoming only significant in the next three to five years. The rest of the world really continues to be relatively unimportant.

From an IT perspective, and as I mentioned I come from an IT background, one of the key drives I look at is basically what is the percentage spent of the GNP of each of those countries. It is quite interesting to look ahead and

look at maybe the US or Sweden who would be considered some of the most developed economic countries in the world and look at what percentage of their GNP their spending on IT compared to the average in Western Europe at the moment. From market opportunity point of view it's quite clear that average in Western Europe is going up to close to the US average over the next number of years. The interesting one is to what extent the US is going to move up from 4.5 percent of expenditure on IT to maybe six for seven percent, which really would be phenomenal. It is quite interesting to look at financial services. Traditionally the large banks—both wholesale and retail—would have been spending five or six percent of their actual revenues on IT expenditures. I think telecos run in the mid-single digits as well. To look at maybe the market leaders like Fidelity in the mutual services, which spend nearly thirteen percent of their actual revenues on IT. So if there is definitely going to be a continued increase in that. So you can work out basically market growth rates in IT by adding both the GNP growth of the country to the IT percentage expenditure.

For me basically working in Europe one of the important things as I have been for the last ten or eleven years from a differentiation point of view which is what I want to come on to next. One of the important issues that come up that doesn't come up in the US is of course the issue of language. We're seeing at the moment that in 1988 about 98 percent of Web sites were in English. It's moving to about—I'm sorry that's should be actually 1996—and 82 percent in the year 2000. That was the quote from The Economist. Those two figures are 96 and 2000. I didn't catch that. And there is a trend basically of the number of Web sites in the future we would expect to English only Web are going to continue to fall. I don't know if any of you have used the Microsoft or Intel Web sites, but they are in twenty languages at the moment. That's quite interesting.

One of the really important things that comes back from my clients when we implement infrastructure and applications solutions for them in the e-commerce area is user interface. If you really look at a lot of the criticisms you get from users of the Websites or e-commerce solution it's the user interface. Anything that confuses them really, really diminishes the propensity to go back to that Web site significantly. And for any of us, and once again I am using the same business-to-consumer one that we all know there is just certain Web sites we go to and at the end of it we just have that feeling there's been a constant and realistic interaction between us and the application we are dealing. I know it sounds kind of funny to talk about the

relationships between people and technology in those sorts of ways, but user interfaces are that way. You get it when you sit down at a Windows 98 computer. You get it when you sit down at a Macintosh computer. You get it when you sit down at Amazon.com in terms of the linkages that exist there. You don't get it when you sit down, for example, at a SAP screen, and that's one of the big issues there. So far more important is business-to-consumer. The second one, of course, is the database integration. How much information is behind there that you can roll out? And the whole concept of the one-to-one marketing, which is customizing the availability of the kind of information specifically for the customer you are actually dealing with. Language issues I've covered. Security. Payment systems. ERP integration. Partner integration. ERP integration in the IT environment is a hot topic at the moment. We're spending a lot of time grappling with those issues of integrating enterprise-wide solutions from SAP or People Soft and trying to integrate them into actual Web-based front-ends. Not as easy as it sounds. Requires a lot of work and lot of skill sets.

And the last one is partner integration—that was mentioned by the previous speaker. In the IT environment when we look at this we certainly see e-commerce as a very, very small component of what's going to be happening out there, based on just the ability to communicate on IP-based networks and exchange information. I use Gartner quite a bit in terms of some of their models. This is the Gartner collaborative commerce model where at the moment a lot of the work that's being done is reactive reporting in terms of Web sites. We're moving out to extending that to trading partners and upping the kind of applications that were used to proactive notification model. We're going to move to a more collaborative commerce situation from the year 2000 onwards. It would take me a long time to explain the details of that. At the end of the day the important really component of collaborative commerce is information. We just have to keep coming back to the word information.

Taxation issues. I thought I would cover quickly. We've come across them a little bit, because we're in several different countries. I haven't done that much work on it. There's a lot of talk about it. Most of the OECD countries at the moment are taxing e-commerce transactions on their existing rules, and there are existing rules that exist for call centers. E-commerce is going to magnify some of the existing issues, but I'm not so sure whether the existing issues that we have become that much different just because of e-commerce. The issues not yet dealt with are does the location of the Web

server affect tax. That's not considered a very important issue, interestingly, if you talk to most e-commerce tax experts. The issue of anonymous buyers and sellers already exists in other paradigms. Digital products are the ones that are going to have the biggest change: The ability to download information. For example, I purchased fifty thousand dollars worth of market reports every year. I purchased them by credit card over the Internet. And that is a PDF file that comes down five minutes after I put through my transaction. So digital products is where it's going to have a big affect. I think that's the area to really think about and focus on.

So just to review what I've gone through in the presentation: I think that Web user interfaces, which is the user interface which sits in front of the IP networks, are the killer applications. Everything moves on from there. E-commerce is just one subset. I think that was reiterated by my previous speaker. It's only the tip of the iceberg. Differentiation is possible through a variety of mechanisms. Most of those involve process design and application development. The main issue there is skills sets. Certainly the value-add that we bring to the table is in those areas. Current tax laws need clarification, but there may not be as many changes as you might think there might be. I know in the States there are several meetings going the whole time relating to sales tax and federal versus state tax, which are issues that may address them. VAT is maybe a separate issue dealt with in Europe. The changes may not be significant, except really relating to [unintelligible word] content.

That's pretty much it. Thank you for your attention.

## DAY TWO: (AFTERNOON): SEPTEMBER 14

## LUNCHEON KEYNOTE AND ROUND TABLE DISCUSSION

## "Internet Security: Issues and Alternative Solutions"

## KEYNOTE SPEAKER: VINTON G. CERF

# Vinton G. Cerf, Senior Vice President, Internet Architecture and Engineering, MCI WorldCom, USA

**Vinton Cerf's slide presentation can be found at his web site at the following address:**

**www.wcom.com/about_the_company/cerfs_up/presentations/intelevent99**

## DAY THREE: (MORNING): SEPTEMBER 15

## SESSION IV

## "Networks of the Future"

**Presenters:**

**Atsuyuki Kodama**
**Colin Williams**
**Gerald J. Butters**

INTELEVENT 99

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# Networks of the Future

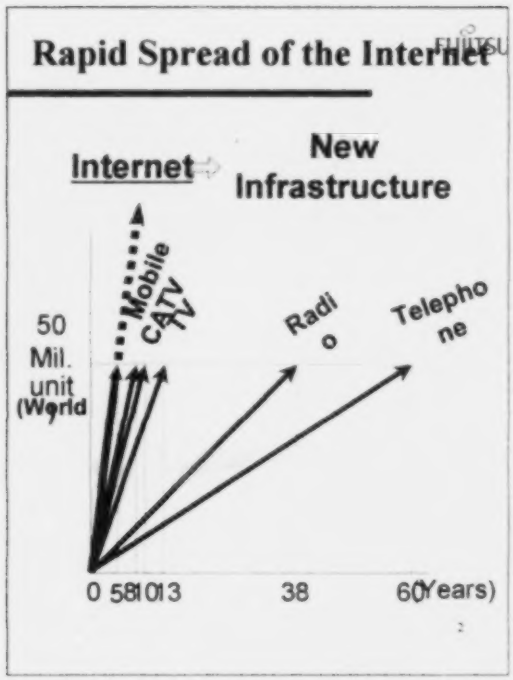
**Atsuyuki KODAMA**
**Int'l Telecommunications Business Group**
**Fujitsu Limited**
**akodama@tel.fujitsu.co.jp**

Good Morning, Ladies and Gentlemen,

My name is Atsuyuki Kodama.

I am responsible for the International Telecommunication Business Group of Fujitsu Limited.

Today, I would like to talk about the networks of the future and suggest where carriers should go in the new telecommunications era from the point of view of Fujitsu as a manufacturer.




First of all, I would like to explain the market trend.

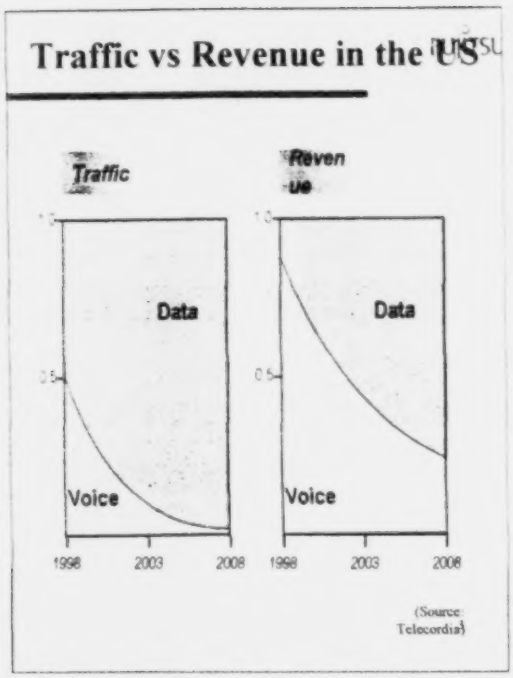
This illustration shows how many years it took each telecommunication technology to spread to 50 million lines or sets world-wide.

It took only 5 years for the number of Internet users to reach 50 million from the time it began to be popular, compared to 60 years for the telephone, and 38 years for radio.

As this shows, the Internet has spread rapidly, and it has become a new infrastructure in the world.

Telecommunication data traffic has been increasing significantly under these circumstances.

In Japan, a working group for the next generation network plan at the Ministry of Posts and Telecommunications expects that a mega-capacity network society will emerge. In such a society, compared to today, 100 times higher-capacity data transmission services, including video services, will be required in each home by the year 2005, and 1000 times higher-speed data transmission service by the year 2010.




On the other hand, what do you think is the impact of this rapidly increasing data traffic on the carriers' revenue?

This chart shows the case in the United States. In 1998, the traffic ratio between data and voice traffic was already 50/50. Despite this ratio, revenue from the data service was less than 10 percent of the total revenue. It is expected that a carriers' profit will decrease dramatically when data traffic becomes the majority of total traffic in the future.

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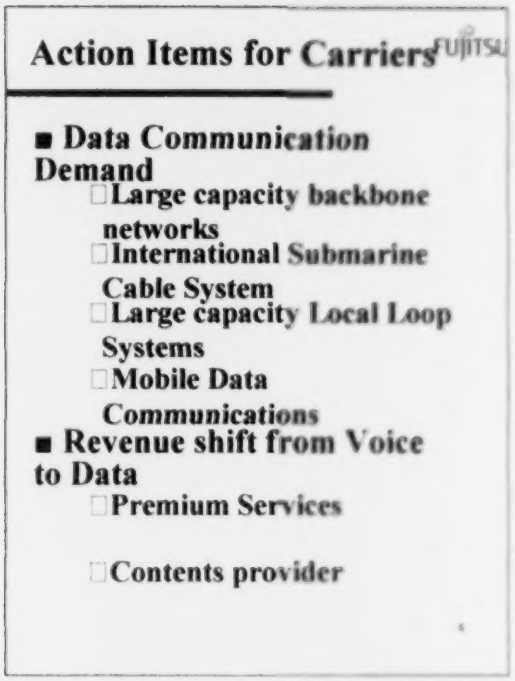


I would like to propose to you how existing carriers can deal with this situation.

First of all, it is necessary to build high capacity backbone networks to cope with rapidly increasing data traffic.

It is also necessary to expand the capacity of international submarine networks as well as that of domestic backbone networks since the Internet has been an international and "border-less" phenomenon.

And besides, it is needed to resolve bottlenecks in the access-networks.

Furthermore, data-telecommunications through mobile networks will also be required.

Secondly, it is necessary for carriers to build their data-networks making use of existing telecommunications infrastructure as much as possible when the revenue generating factor is changing from voice services to data services.

Based on this, it is crucial for carriers to gain revenues by value added services such as Premium Services and by becoming Contents Providers.

# Action Items for Carriers

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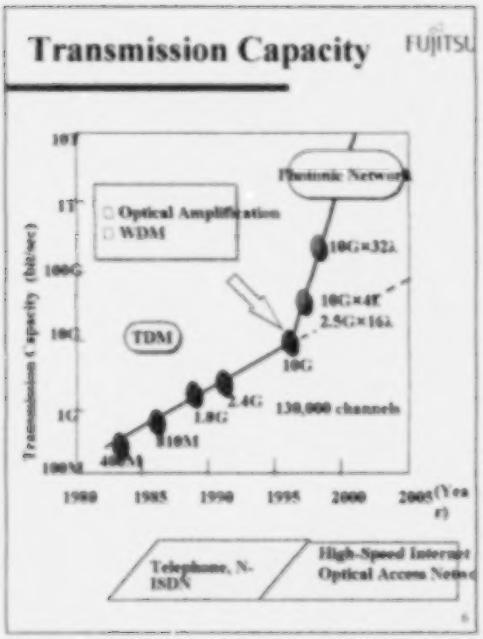
- **Data Communication Demand**
  - ✓ ☐ Large capacity backbone networks
  - ☐ International Submarine Cable System
  - ☐ Large capacity Local Loop Systems
  - ☐ Mobile Data Communications
- **Revenue shift from Voice to Data**
  - ☐ Premium Services
  - ☐ Contents provider




As for the capacity of networks, it has expanded by 4 times in every four to five years with TDM technology. Since WDM technology began to be deployed in the network around 1996, the capacity of the transport system has increased dramatically.

WDM technology enables the transmission of a lot of optical signals that have different wavelengths in a single fiber. The technology is so good that it makes it possible to make use of existing fiber, and thus to match investment in plant and equipment to the demand step by step.

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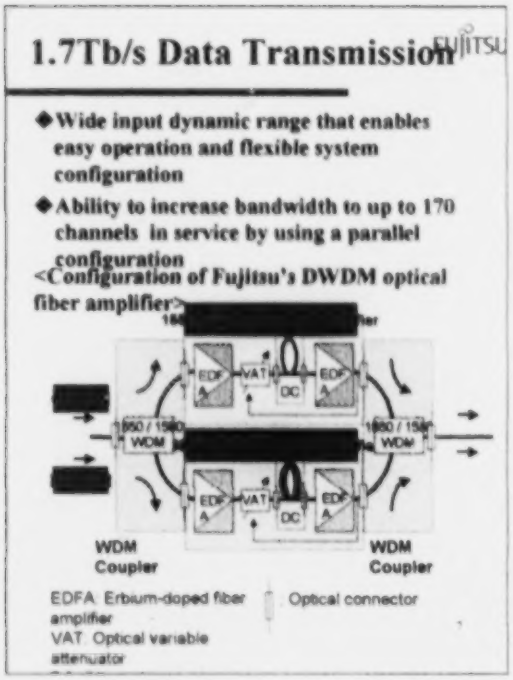


Fujitsu has already made the"FLASHWAVE320G " commercially available. It's capable of multiplexing up to 32 wavelengths of 10Gb/s transmission signals.

Although I announced at the Intelevent last year that our success in our experiments with 1.1Tb/s WDM transmission was recorded in the Guinness Book, we have also developed a DWDM optical fiber amplifier which is capable of transmitting up to 1.7 terabits per second. We are planning to make it commercially available by the second half of the year 2000.

One of the key features of Fujitsu's new optical fiber amplifier is its ability to support flexible configurations of up to 170 channels in accordance with capacity demand.

Also, Fujitsu has already developed a Tunable Wavelength Transmitter as well as this DWDM optical fiber amplifier. Fujitsu's Tunable Wavelength Transmitter is capable of transmitting eight channels at 50 GHz channel spacing based on an ITU-T standard grid. Until now, 170 different transmitter units were required to transmit 170 channels of optical signals. Now, however, only 22 different transmitter units are required, resulting in a dramatic improvement in efficiency and cost.

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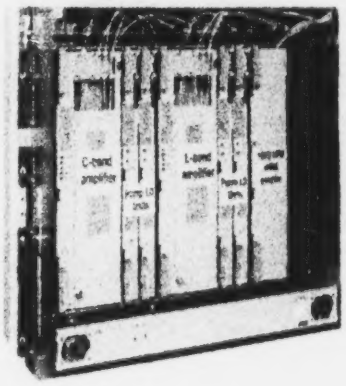
## 1.7Tb/s Data Transmission

**- Fujitsu's DWDM Optical Fiber Amplifier**



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This is a photograph of Fujitsu's newly developed DWDM optical fiber amplifier.

# Action Items for Carriers

FUJITSU

■ Data Communication Demand

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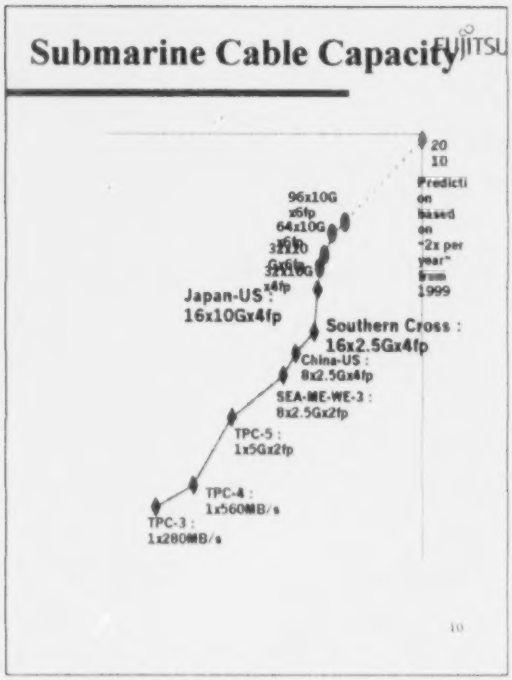
- ☐ Large capacity Local Loop Systems
- ☐ Mobile Data Communications

■ Revenue shift from Voice to Data

- ☐ Premium Services
- ☐ Contents provider




This chart shows the capacity growth of the submarine cable system.

As you can see from this chart, the capacity of the submarine cable system is expected to increase by 100 times in 10 years, between the year 1990 and the year 2000.

This trend will be accelerated by both the data traffic explosion and DWDM technology and in 10 years, it is estimated that submarine cable capacity will reach 100 Terabits per second, which is 1000 times larger than the current capacity.

Fujitsu plans to deliver 120Gb/s(2.5Gb/s by16 wavelengths by 4 pairs) submarine long distance telecommunication systems to the Southern Cross project, and 640Gb/s systems to the Japan-US Cable project. Both projects will be ready for provisional acceptance (=RFPA or turned over) in the 3rd quarter of the year 2000.

We plan to commercialize a 2Tb/s (10Gb/s by 32 wavelengths by 6 pairs) submarine cable system by the year 2002 and a 5Tb/s (10Gb/s by 64 wavelengths by 8 pairs) submarine cable system by 2005.

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# Action Items for Carriers

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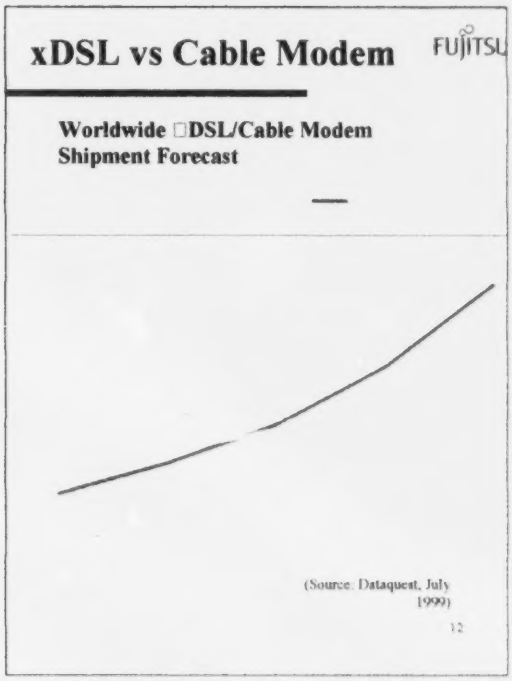


As the capacity of the backbone network expands, the capacity of the subscriber access network becomes a bottleneck for Internet connection.

As solutions to such bottlenecks in the subscriber access network, there are two technologies. They are Cable Modem and xDSL.

Cable Modem can provide relatively high speed data transmission, but it has weak points : its service is limited to places where CATV networks are installed and the data transmission speed becomes slower in the case where network traffic is congested due to the fact that the subscriber access network of a CATV network is usually shared by multiple users.

Moreover, it has security issues to be resolved.

On the other hand, xDSL can be easily installed everywhere a telephone line exists, however, users cannot gain the high speed data transmission they expect when the distance of the access line is long or an access line has noise.

Therefore, we simply can't say which is better. We think carriers will choose their technology based on which network is available to them, CATV networks or subscriber lines.

In the United States, CATV networks has been introduced earlier and are more widely spread throughout the country. Due to this large usage in the States, the number of Cable Modems has been larger than xDSL subscriber lines in the world statistics.

However, if we take into account the expansion of Internet service outside of the United States, xDSL subscriber lines will provide a major solution as they enable the efficient use of existing subscriber lines.

Fujitsu is supplying its "SPEEDPORT™ xDSL System" in the North American market,and its share ranks second. Fujitsu is also supplying this product to European and other countries.

# Action Items for Carriers

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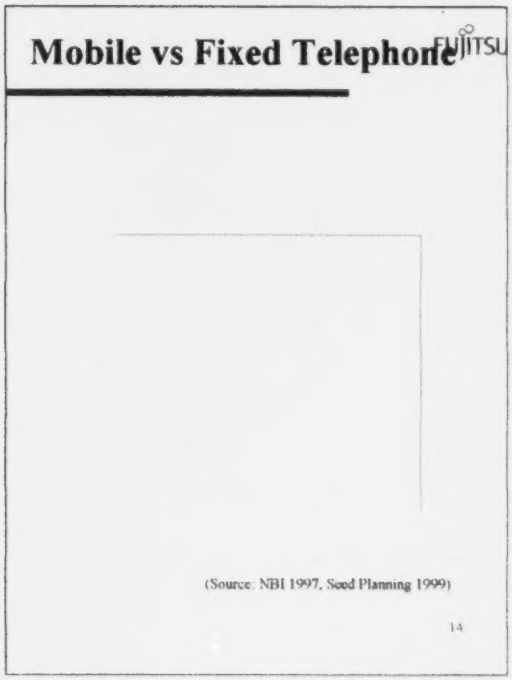


Next, let's look at the trend of mobile phone.

The number of mobile subscribers is expected to increase at an annual rate of 16% while fixed phone is expected to be 6%. If this trend continues, the number of mobile subscribers is expected to exceed that of the fixed phone subscribers in the year 2010.

I should say that mobile phone would take the place of fixed phone because the next generation mobile specification, W-CDMA can support international roaming and high speed data transmission.

Fujitsu plans to introduce an ITM-2000 system into the Japanese market in 2001, the first in the world.

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# Action Items for Carriers

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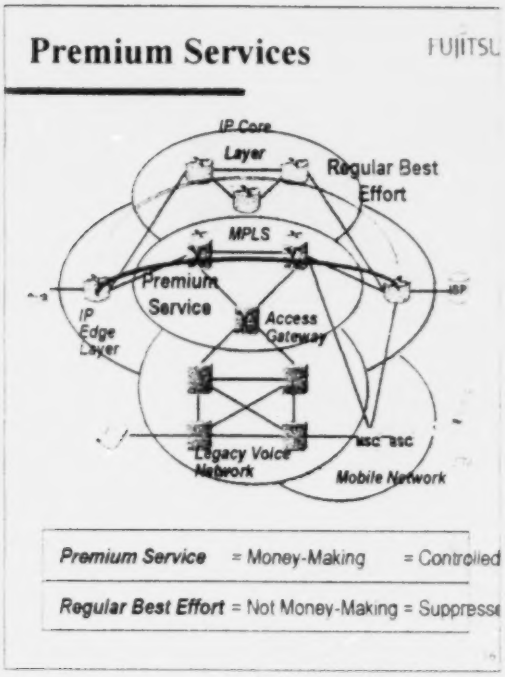


Next, I would like to explain Premium Services.

Internet service today is mainly used for e-mail and Web browsing. Cost effectiveness is the first priority and the Quality of Service(QoS) is secondary for current internet users. However when e-commerce or account settlement service starts in the near future, users will be more sensitive to the QoS.

Web browsing and e-mail service will be supported through "Regular Best Efforts" by router, and e-commerce and account settlement will be supported by "Premium Services" using IP over ATM with MPLS function.

We think that it is important for operators to meet their customer needs and to increase revenues by introducing Premium Services.

Fujitsu has the ability to satisfy customer demand for QoS by providing its E-Cube ATM Switch with MPLS.

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# Action Items for Carriers

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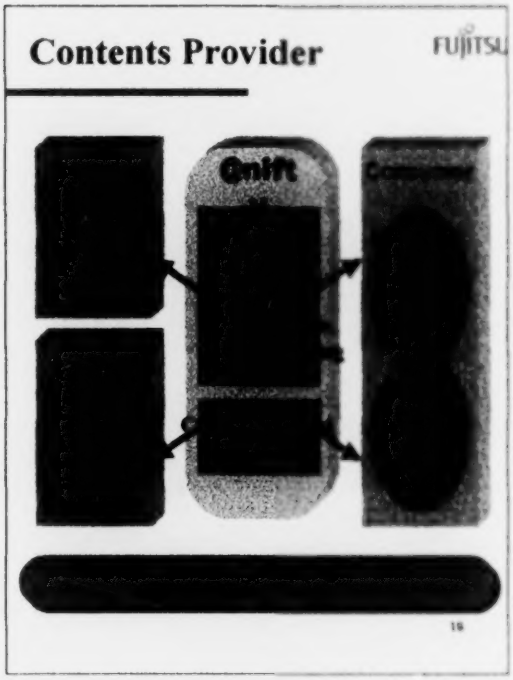


Lastly, I would like to touch on providing contents through the network.

As Internet service is expanding, corporate business communications are much more dependent on Web based tools.

With this trend, telecom carriers and ISPs can provide Contents to their subscribers in collaboration with manufacturers, banks, retailers or wholesalers, and so on. It is because they need to provide goods or information over the Internet, also because telecom carriers and ISPs have both the network infrastructure and subscribers who can become a big potential business opportunity.

Fujitsu has Japan's largest Internet service provider with 3.5M subscribers under the name of Nifty, and we can provide lots of business opportunities to our customers through Nifty. We plan to build a virtual network city with 10M subscribers in 5 years by constructing higher levels of network security and by establishing partnerships with various companies such as banks, retailers or wholesalers, etc.

A few examples of the Internet business that Fujitsu plans to provide are "an Internet Bank" in association with Sakura Bank, "an internet security company" in association with Nikko Securities Company, "a membership education service", and so forth.

There is no doubt the telecom industry market is very competitive but it is also a source of great opportunity. We have to appreciate that we are at the center of a very attractive market place and we would like to contribute to building a future network society with all of you here.

Thank you for your attention.





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## Colin Williams, President and CEO, Level 3 Communications International, United Kingdom

Thank you very much indeed, Dr. Schwartz-Shilling.

I'd also like to add my thanks to Ron for BT, particularly to two very old friends: Alan and Jerry, for a fantastic party last night.

It's a little know fact that in 1987 Iain Valiance asked me to be BT's Director for Scotland, and I actually got as far as looking for houses in Edinburgh. I've always regretted that it actually never happened. In the middle of the process, in fact, we decided to reorganize and I moved off in different directions, which perhaps I don't regret, although I do regret not having a chance to live in Edinburgh. So it's great fun to be back here.

I would like to take as my text for today an article written in fact by an individual called Dan [sounds like Doltson] from PA Consulting in Princeton in the States in the context of what is the future of networks. Big, fat, dumb pipes I think sums up what we need as an industry and certainly sums up what we at Level 3 are trying to create. It's actually quite intriguing because as I'm sure we've seen in the last two days a huge amount of emphasis today on what is driving growth. The Internet tends to be the shorthand. We actually take a slightly different view. We've consistently said now over the last two years that what we are actually seeing in telecommunications is actually what we saw in the semiconductor industry in the seventies and the computing industry in the eighties—and that is impact of silicon economics on demand, on price, [and] on cost. An for those non-economists in the room, let me just briefly summarize the affect of silicon economics. It's an environment that is created by very dramatic reductions in cost, which are translated into very dramatic reductions in price, which in turn drive higher rates in fact of demand. It's what the economics call price elasticity. You have a price elastic product or service when the demand in fact increases at greater than the rate in fact of price decline. If we look back to those eighties at the computing industry and the sort of silicon economics we saw impacting it at the MIPs world, we have a situation where for every one percent reduction in price we actually saw demand growing by 2.5, 2.6 times, 2.5, 2.6 percent. What that actually meant was we saw huge increases in the capacity available to individual users from a computing point of view. We're seeing the same thing

occurring in communications, but we're actually seeing it really for the first time. If you actually look at long distance telephony, and I'm going to talk predominately about long distance telephony, it's been a non-elastic product. For every one percent reduction in price, we've seen about a .4, .5 percent increase in demand. What is exciting for those of use who are actually building big, fat, dumb pipes is bandwidth is proving to be genuinely price elastic. We're seeing the same sort of elasticity as we actually saw in the computing industry. Our estimate is it's about somewhere between two and three percent for every one percent reduction in price. So it's actually silicon economics, which is actually driving the opportunity, which Internet and the World Wide Web, in fact, are taking advantage of.

The huge opportunity also exists as the result, in fact, of existing and rapidly changing underlying costs. We look at the cost today of IP telephony versus the public switch telephone network. We see a fairly dramatic difference. I would emphasize this is a cost-based analysis. This is actually looking at the cost, in fact, of moving a CD ROM's worth of data form the East Coast to the West Coast: about twenty seven dollars by the time it's actually moved to our box through a long distance carrier. That compares to less the two dollars, in fact, if you actually move it across an ISP. So you have a thirteen to one relationship in 1998 between circuit switch world and the IP world. It's clearly now a fact that IP is the standard of the future. We're actually seeing quite extraordinary rates of development both in the underlying technology and opportunity to use that technology. What is fascinating here is IP is truly a market-based standard. Historically we've actually had government and bureaucrat driven standards through the ITU, through the PTTs. They have, I think we would all now admit, been glacially slow. We move into a market-based standard and you've suddenly got thousands, tens of thousands, hundreds of thousands of entrepreneurs endeavoring, in fact, to take full advantage—and that's exactly what we're seeing in the IP world.

We look at a conventional network—Level 3 in this case, but it's not dissimilar in fact to many of our competitors' networks—we can actually see a number of things beginning to change in that network. The elements are fairly standard today: An IP network typically sitting on top on an ATM network, which is provided the quality of service. WDM is having huge implications in terms of bandwidth capability. And it's interesting to note, I think important to note, there are really five elements in that network. We've tended as an industry to typically think of four elements. I'm going to come back and talk about the fifth. What we're actually seeing—again

this really helping to identify the changes, the dynamics that occurring in the cost model—we're actually seeing IP develop extraordinarily rapidly. We're convinced, and I think most people are convinced, it will fairly rapidly squeeze the ATM piece half of the puzzle. WDM similarly, in fact, is thrusting up the model and we're getting, in fact, a much thinner SONET or SDH layer—all with huge implications for the underlying cost. We've been doing a lot of work over the last two years of the company, but more recently we've been doing it in conjunction with Lucent, with Nortel, with Corning in the context of what really is happening to cost. If you begin to understand the cost model, then obviously as organization and as an industry, we can begin to understand the price model and ultimately the scale of demand. There is now very clear historical evidence that very much in the same way that Moore's Law drove price performance in the computing industry, or perhaps an interpretation of that, we are now seeing the same sorts of things occur. We actually look at the IP piece, which here I have included ATM, where actually seeing a doubling of price performance about every twenty months. The IP alone is actually doubling rather faster than that. We look at optical networking, including the fiber, we're seeing again a rather similar situation about every twenty-two months, although again if you look at the elements within that, DWDM is probably actually demonstrating price performance improvements every ten or twelve months. So even on a conservative basis, we actually have the cost model showing fifty percent per annum improvements.

Now what I think is perhaps well identified—and it's interesting this slide, which we've been using as organization probably for a year now actually quotes both Nortel and Corning—is the dramatic changes that are taking place in the fiber environment. If we look to the beginning of this decade at single mode fiber, we see pretty rapid improvements in price performance: Certainly no slouch. But we've begun to see the speed of change increasing, and the number of new generations beginning to occur. So we saw in the mid-eighties non-varied dispersion fiber. More recently a number of us have begun to install LEAF fiber. [LEAF is the registered name of a single mode, non-zero dispersion-shifted fiber from Corning.] When is interesting when I used this slide perhaps six months ago, there were two next generations that we could identify in the laboratories and we were quoting figures of fibers will change, we'll see new generations of fiber perhaps every three to five years. Corning is now prepared to put their name behind the fact that we'll see next generation fibers occurring every twenty to twenty-one months. You've now got clearly to take account of the fact that's what happening to

the underlying economics of fiber as well as what is actually happening if fact in the .... So huge, huge changes in the way costs are changing and we believe huge changes necessary that you design and plan networks and network construction. We've taken, I think, a fairly unique approach in Level 3 to one thing we think is important in the context of ensuring that Level 4 doesn't appear a couple of years down track and over build us. We're actually building multiple conduits, typically twelve conduits in our long distance networks both in the States and in Europe. We're actually downplaying the amount of fiber that we pull initially. We could pull four hundred fibers into any one of those conduits. We're actually not doing that. We're typically today pulling about seventy-two fibers, and if anything that number is tending to decrease rather than increase. The reason we expect in fact to pull the second cable into the second conduit probably within two years. We will actually consciously overbuild ourselves two years down track. If we're right in the way this technology is evolving, we'll do that again every two years until the point where the capital cost and operation and maintenance cost of the next generation of fiber actually is lower than the earn and costs of that first generation of fiber, at which time we'll actually pull that out and the process will start again. Why, you ask, twelve when we're only prepared to need five or six? The answer is that we're very happy to sell those conduits to our competitors.

And it's interesting, it's not just a continues upgradeable networks, it's also actually to beginning to understand how the market is changing, how the service requirements are changing, and every element in fact of the network needs to optimized. We think we're quite good at it, but we don't pretend to have all the answers, because what is extraordinary is you really need to begin to stretch your mind out two, five, ten years in the context of how is that network going to look when its full, what sort of space you're going to need to provide your own needs and your customers' needs, how you actually cope with real estate acquisition in the context of meeting dark fiber requirements for your customers—a whole series of changes. The fundamental of network construction are changing and changing extraordinarily.

Now I've deliberately chosen a slide here—actually almost against myself—that demonstrates (this is a piece of work done by a Boston consulting firm) is the rate of demand growth that is being envisaged and forecasted by the network builders is very visible. You can actually see capacity, which is European capacity, growing in fact from relatively modest levels today to

that case they think thirty-four, thirty-five terabits within five years. Now that same consultancy study suggests in fact that demand is growing at a much lower rate. I just think they're wrong. I've been know in previous Intelevent conferences to criticize the industry for underestimating the rate of demand growth, and certainly in the context of this particular piece of work, I think the bandwidth supply is an interesting piece of analysis, but I think the demand forecast, while I won't use a rude word, is actually wrong, plain wrong. And why do I think that? If you actually look at what is constraining demand, it's us as an industry. You can have color you like as long as it's black, as long as no more than two megabits, and by the way we're going to charge you an arm and a couple legs for privilege. That's been the industry approach until probably 1997, 1998. The cost of bandwidth has been too high to allow a whole raft of technologies to really take off. That is now visibly changing, courtesy of the efforts in terms of liberation around the world. We're seeing the cost of bandwidth decline and decline very dramatically. It's beginning to allow things that wanted to use bandwidth to do it in a very effective fashion. So if you actually look at some of the examples: e-commerce has taken off, partly because of the Internet, partly because the cost of bandwidth is becoming economically sound. We're seeing the physical distribution of software, the Internet distribution of music, video on-demand coming over the Internet, all occurring because little by little the cost of bandwidth is moving into sensible territory. We're actually seeing brand new industries established: The Internet service provider industry in the mid-nineties, today the application service provider appearing out of nowhere and generating quite enormous demand.

The Web-centric part of the market is explosive. We think that's going to have couple affects or perhaps it's already having a number of affects. We're all familiar with what happened in the early eighties to IBM who went from a seventy percent market share as a totally integrated organization in every facet of computing to a situation today where the computing industry is totally fragmented and disaggregated. We believe we will see, and perhaps are already seeing, that same desegregation in the telecommunications industry. We don't believe that traditional carriers who are all things to all people can any longer survive. We as an organization have chosen to be that space down in the bottom right hand corner. The opportunity to have thirty or forty percent market share in a niche, even a commodity niche, is far more attractive than being a three to five percent new entrant player in the broad integrated market place.

So in summary, we think networks are changing and changing fundamentally. The big, fat, dumb pipe offers tremendous opportunities both for the operator, but importantly in fact for the customer. We clearly recognize, as Kodamasan has highlighted, that voice will continue to dominate in revenue terms. There's a great deal of activity going on in trying to dramatically reduce the costs and price of voice so we can begin to see a better balance. But it's actually quite interesting, if you actually look at the market place, and IDC suggests that less than ten percent of the revenues in 1998 were associated with IP and with data. What is interesting is we're seeing a Web-centric market appear, which is completely unknown from anything we've seen in the past. Interesting, as an organization, as of the first eight months of 1999, over eighty percent of our revenues was driven by a market that didn't exist in 1997—and we're growing very fast.

Thank you very much.

## Gerald J. Butters, Group President, Lucent Technologies, USA

Thank you very much, Christian, and good morning everybody. The material I have here is a composite of reasons as to why network architectures need to change, because of the world we live in. I'm going to take you through what next generation networks are going to look like. I can build off of Kodamasan's talk as well as Colin's.

First of all I call this [slide] the obligatory traffic factoids. At lot of this had been covered in the session, so I will not go to far down into it, except on a couple of points. First of all, in 1998 television viewer ship decreased for the first time in history. The reason for that is there more people spending more time online and less people parked on their couches watching television. The fusion of television, especially high definition television, with e-commerce applications, both Internet and intranet, is going to be probably largest "killer application" and the reason for monstrous consumption of bandwidth and increasing bandwidth demand.

This [slide] is on the economics. This is based on an economic study to determine the true cost to provide a currency service as a one and a half or two megabits service per month over sixteen kilometers or ten miles. Hard, true costs: has nothing to do with price, has nothing to do with the artifacts of tariffs and regulations. This is the bill of material for service providers to provide this absolute cost. It was indexed using the technologies of 1997 that were broadly deployed. That's the index of 100. If you look at what happens with the introduction of wave division multiplexing technology, you get about a thirty-five percent absolute decrease in the cost of providing that service for that month. And as you increase the channel count in wave division multiplexing, integrate for things like IP as Colin has referenced, improve the speed in the time division multiplexing, change your business model at bit, [then] by the year 2000 if it costs you one hundred dollars or one hundred francs to true cost provide that service in 1997, in the year 2000 the true cost is one dollar or one franc. The other thing that happens with it, amplifying on the points of my colleagues have made, in addition to that you get enormous capacity. In point of fact on the graph here, scaling up in terms of terabytes per day, you can see that these kinds of systems actually subsume all of the—in the example the US long distance traffic and the Internet traffic that could be measured in the US in the period of time.

Industry impact [slide]: This is on Colin's point. We've spent a lot of time in Bell Laboratories and operations research trying to determine what price elasticity for bandwidth is going to be. This [slide] is just charting what is means. If that elasticity is less than one, then there is going to considerable near-term consolidation, i.e., few players. We don't think that's what it is. In point of fact, we think that the elasticity is greater than one. Our estimate is that it is about 1.5. You can see this reflected in Colin's comments. You can also see it this week in Southern Cross. Southern Cross announced what are really gigantic price decreases for their services. In the preface of the press release, they said they had a good hard look at elasticity and they concluded that the price elasticity was greater than one, therefore they have business basis for decreasing prices in what would be only a couple of years ago a very scarce commodity.

Now here's the other thing that goes with that. There is a worldwide eruption of carriers. There are now more than fifteen thousand carriers in place or announced. Ones who announced will by and large complete their builds by the end next year [2000], with lots and lots of fiber.

Now this [slide] says we're in a world were there is going to be supply side economics as opposed to demand forecast planning. So all of the telecommunications engineers who grew up with [two unidentified words] – should probably put those books away. Now that means expanded revenue opportunity.

The asset management was touched on yesterday. We believe, and I think our colleague at Level 3 and others around the world would agree, that you now have to look at replacement of core technologies about every other generation or you're going to get beat by a new entrant or someone that employs a strategy like that. The other thing is the comment that was made yesterday, which we would like to amplify on; in this market space that is evolving, time to market is critical. We think the analog is probably going to be like the PC world where product life gross margins are earned within the first ninety days of sales. Think about that. That means successive waves of new products and new applications that flow through on top of these capacity pipes.

Now, this [slide] is to give you an illustration of how serious this work is being taken. This is the European example. If you look at the route map

here, you can probably determine what country it might be. This is what is being planned for implementation currently. By the way, twelve months ago the network planners responsible for this network believed that two and a half gigabits per second time division multiplexing [TDM] would suffice and perhaps eight to sixteen wavelengths would take them out to about 2005. Well, here's the reality of the situation, and this is what is currently being planned and built. Thirteen rings. You can see the wavelength counts in there—on these routes. Absolutely unimaginable two years ago. 2003: systems requiring this kind of capacity and that kind of environment. And this is done using the calculus of all of those factoids from the Internet, plus anticipated projections for the impact of broadband technology really reaching businesses and then residents—and a lot more streaming video, streaming audio, [and] a lot more instance presence applications. So, the question to us [Lucent] became as we saw this was not did we need to do it, but are we going to able to push research far enough and fast enough in the optical domain to be able to produce systems with these kind of capacities in such a short period of time.

Well, I'm going to get to the answer to that question here. This [slide] is a primer of the spectrum of interest; we're not going to talk about cosmic rays and long electrical oscillations. I'm going keep it into the fiber optics domain here. We that the photonics from a cost perspective represent better scaling and faster innovation. The innovation cycle in the optical domain is somewhere between nine months and eight months for the doubling of capacity at this particular point in time.

What I'm going to do is take you through the network elements from transport right down to primary interface level to develop the case for what network architectures are going look like. First of all, talking about electrons first and electronic time division multiplexing [ETDM]. Forty gigabit per second time division multiplexing systems has been announced. Lucent has announced one. Some of our estimable competitors have announced others. The state of the art in electronic time division multiplexing is actually, we believe, being defined in joint laboratory work between British Telecom labs and Bell Laboratories. We now know how to produce a device on the bench top that will do a hundred gigabits per second electronic time division multiplexing. The ultimate reach for that is probably about one hundred and sixty. We don't know who to build the devices to be able to do that. So in the electron domain in terms of time slicing that will continue and once again it's been accelerating. The time

period between ten gigabit and forty gigabit per second time division multiplexing systems is much shorted that the space between two and half and ten.

In the optical domain, optical time division multiplexing [OTDM] and wave division multiplexing [WDM], there are now 320 and 400 gigabit per second wave division multiplexing systems actually in service. That is the new deployable standard for wave division multiplexing. In the laboratory, the following things have been demonstrated: last week Bell Laboratories demonstrated over one hundred kilometers a thousand and twenty-two per fiber system. This, by the way, is a significant breakthrough. This comes about one earlier that I thought the researcher would be able to crack that. Two week prior to that, they also demonstrated a single channel, 160 gigabit per second system that combines optical time division multiplexing with polarization mode multiplexing—a very interesting approach, which suggests that we will see 160 gigabit per second optical and polarization mode systems embedded inside of wave division multiplexing. So the bottom line is an awful lot more channels inside of fiber and much higher bit rates in terms of transmission speeds.

However, like the human brain, much of fiber's potential remains untapped. This [slide] is the attenuation curve for fiber up to the point that all way fiber was introduced that eliminated the water peak that you can see at the 1400 nanometer space there. We believe now the challenge for our research, and certainly I believe our colleagues would say the same thing, is how do we maximize the bandwidth over six hundred nanometers of spectrum inside of fiber. There are a couple of things underway. This is a fifty gigahertz, thousand channels that would give your fifty terahertz capacity. Looking to the full spectrum here: six hundred nanometers, a hundred and forty terahertz. All the systems that are currently produced have low spectral efficiency in the optical domain. So one of the big challenges here is to get the spectral efficiency up—that's the bits per hertz. That is going to require new coding techniques, probably spread spectrum encoding, perhaps fractal imaging launch coding techniques inside this to really get the spectral efficiency up.

The other thing that's happening is amplifier technology: Raman amplifiers are appearing in commercial systems sooner than anybody projected even a year ago, and this has energized work in Soloton-like systems, exploded pulse, qusi-linear return to zero systems, and has accelerated research in

things like colloidal quantum dot technology. So a lot more focus in this area, and it has really been accelerating.

The context for my remarks has to do with terrestrial systems, submarine systems, and also free space. This [slide] was the world's record last December of a free space system called OpticAir produced by Lucent. This is a wave division multiplexing system that transmitted ten gigabits per second, that's four channels at two and a half using conventional 1550 nanometer technology behind the high power amplifiers and the telescopes over 4.4 kilometers.

This [slide] is now over two weeks ago. We demonstrated on the same systems platform a forty-gigabit per second transmission rate—sixteen channels, two and a half gigabits. Once again what sits behind it is commercially available: SONET and SDH gear. The reason for a lot of interest in this is, first of all, it uses expanded beam laser technology, which means the power per centimeter is very low, which is why it is Category One or eye-safe. The other thing is because of the beam size at arrivals about two meters; you don't need to worry about birds flying through it. Its spectral efficiency characteristics are actually better than LNBS fixed wireless systems.

This [slide] will give you an indication of range versus typical or atypical weather conditions in a particular environment. There's a tremendous amount of information in this. One of the first applications for this is going to be: ABC will use this technology for Super Bowl 2000 in January 2000. Global Crossing and others are trialing this equipment. They see this as a very nice way to get to market quicker or to get deployment to customers on a very rapid basis. We have a couple of our customers who are interested in using [tape 6 ends]

[Tape 7 begins] In point of fact, if we do the aggregate amount of stuff that's being shipped in this space this year in our projections for next say that's it's still growing. However, Colin's comment about it getting thinner and thinner and eventually disappearing is we think accurate.

In core networking, we've proposed a solution that's based on the strong error correction program that was developed for submarine systems, that actually enables you to take whatever protocol and digitally encapsulate it and get it into the optical domain very, very efficiently. This is a big deal

because it means fewer protocol conversions, hence lower cost. It is also going to be required to manage more and more information in the optical domain in any event. This [slide] is just a schematic of how it works. The metaphor for what it is: is if you think of a DS Zero Service or a 64-kilobit service as being one lane on a highway then fiber would represent twenty-five million lanes or a highway that was sixty thousand miles wide. With all the different kinds of traffic imagine the problem at the tollbooth. What WaveWrapper does is really the "Easy Pass". It allows the flow of information from point of origin—whether it's IP, IP Prime, ATM in all of its versions, SONET, SDH, Gigabit Ethernet, or the next big thing. It enables it to get into the optical domain, be managed efficiently in the optical domain, and exist the optical domain at the right destination.

Here's a problem with high-level presentations. It has to do with all that bandwidth there has to be way to manage it in a much smaller footprint than it currently is. This is the problem. This [slide] is the network at ground zero. It's big; it's complex. One of the challenges certainly that the industry is taken on from a vender perspective this is the environment of I will call it circa 1998. If you look at what is housed in an exchange or a central office, you have a lot of access multiplexing, you have digital switching, you have ATM router switches, you have digital cross-connect systems, and you have transport network. If I took this is a simple environment, this would be about twenty-eight days of equipment. We tackled that problem with a product called BandWidth Manager, which this is not a sales pitch for. What we did is we said there has to be to integrate this, get that footprint much lower, and make it a far simpler thing to manage. In the prior diagram, you would have had multiple network elements talking into a subnet controller working its way northbound to a top-level service management, network management system. We found that it is possible to do this. In point of fact, we created eleven [unintelligible] that have the equivalent computing power of a thousand Pentium IVs. What happens here is you get an enormous reduction in the capital cost—that thirty to sixty percent that's referenced there is hard fact based on case studies with customers. Monstrous reduction in space and power savings, which is a big deal when you think about the cost of floor space—of course, a lot less in installation. Very scalable. The first system we believe that's been produced for networks that has seven 9s reliability.

Let me take you into another space. Once again this [slide] has to do with managing the wavelengths and the fibers. We had a technology beauty

contest that we ran for about a year to try and select the best way to do optical cross-connect, leading to optical switching. We ended up with nanomachines. These are microelectric machines. This is an illustration of platform element that will be going into the product that will be release next year [2000]. This is just a cartoon of how the thing actually works. Very neat devices: it's on the silicon learning curve, so you can make these in big wafers. You can cookie-cut them. They're self-actuating. The machine, by etching away the stuff, actually springs to life. It's very fast. It's millisecond switching time, which is good, which means the protection switching can drop from about fifty milliseconds down to millisecond range—very, very reliable. Trillions of operations and dirt cheap, by the way. The other thing that goes with this is that it uses high voltage. There's virtually no current drop, so this will have a lot of appeal for network providers as they think about managing bandwidth and networks.

Moving out of core network over to routing, a lot of news this year down the electron domain in terms of people announcing things gigabit router switches, terabit router switches, higher capacity ATM. The thing that has gone with that is integration of optical transceivers on the backside of those boxes to eliminate a network conversion or a protocol conversion. So these things will get into the optical domain quicker than they ever have before. Now where that leads, of course, is work that both British Telecom lab and Bell Laboratories and NTT have been looking at, which is digital logic in the optical domain. I won't spend a lot of time on that one here today. This really means creating "and" and "or" gates in the optical domain—a little tougher than the digital domain, because photons won't wait.

In terms of interfaces, I want to cover some of the space here. This [slide] is just to give you the continuum from the wireless radio frequency world through the enterprise world and up into the transport layer. We have work underway with a couple of partners in the US to apply wave division multiplexing and high speed time division multiplexing into the server, mass storage, and local area and wide area networks. What does this mean? This means very low cost, very high capacity optical transceivers that get integrated into things that would not be classically thought of as network elements. This is a big deal. This is about the last meter, not the last mile, the last meter. I won't spend a lot of time of this. Just to let you know that at Telecom 99 we're going, with our partners, to be demonstrating wave division multiplexing and very high capacity time division multiplexing with those who have largely served the enterprise.

Take you into another space here. This is where the wireless world and the optical world come together. This [slide] is an illustration from work that has been done by British Telecom lab. This is a passive optical picocell. There are other initiatives underway in this area. There is another initiative that is actually looking at doing this, not just for wireless, but also for television signals. The other one is the creation of communicating stuff that they [a couple of guys] call "smart dust". This is a nice topic for another day, since I'm running out of time.

Let me tell you how this [illustration] works and why it's interesting. The laser powers the electro-absorption modulator. So, it's "look ma" no moving parts, no hands. So the laser actually stimulates this to both transmit radio frequency as well as receive it. So it's a very neat device. Once again, because it's on the silicon curve, it's dirt cheap to make. This is the thing that will be aggregating all that traffic from things that have been illustrated over the last couple of days: Micro-microphones, palm devices—these are the bit dribblers. They don't require gigabit, but they do require kilobit. You'll see these get embedded in networks.

OK. Last area here [slide] before I get to conclusion is in storage. If you're heavily invested in companies that do magnetic storage or electronic storage, you might want to sell short. The reason for that is we're moving to commercialize holographic storage now that the puzzles of the materials have been figured out and the access. The reason that this is a big deal is because the polymer that's used to store this in terms of its storage density is six orders of magnitude greater than can be done magnetically or electronically. And the access time is two orders of magnitude greater quicker. This means it now becomes practical to put storage inside of networks and not inside of your PCs.

OK. New optical frontier: lots of them. Good news for operators is this is the Jenny Craig Weight Reduction Program for networks—lighter, faster, cheaper, better. Coming attraction. Our architectural cosmonauts at Bell Laboratories now believe, because of things like security and cost, it will be possible to create a new network architecture in the optical domain, which is principally wave length managed, but it's going to optical circuits. Stay tuned for more on that. This [slide] is an illustration of where the crossover points are. We think that as the penetration to things like digital optics, optical transceiver technology reaches its way into the router switches, the servers, and the storage area, the network can then be flattened.

Here [slide] is the design specs for the CyberScape. Throughput and latency must improve categorically, so the place where we are putting the stress on our researchers, recognizing the laws of physics, is for infinite throughput in systems and zero latency. Latency is a real big deal; it's the most frustrating thing in the use of any network. Seven 9s reliability: With a concentration of, we'll call it, commerce inside of fiber-based systems , reliability becomes an absolutely enormous deal—and, of course, it's got to be a lot cheaper and it has to provide support for rich media applications. We call it applications that get us closer to the holideck [slide]. For of you who don't know what the holideck is you're on the bridge of the starship Enterprise, you've been fighting Klingons all day, you need a break, you go to the holideck, you dial in whatever is whatever you want to do, and it's holographically created for you. Now, we're not going to have that anytime soon, but you need to think about your network architecture's ability to support applications that will move in that direction. So that's the headroom factor.

And finally, here's [slide] the punch line: The best rule is Amdahl's Law. When Gene Amdahl was working on the 360 program at IBM, he was trying to understand what latency meant when you linked 360s together to solve problems. And he discovered something: for satisfyingly low latency, that is a response time of less than seventy milliseconds, which coincidentally is the twitch time of a teen age arcade game player, you had to match every MIP with one megabit input/output capability. That is the problem with all networks today, which the exception of those that the government may have built. And in point of fact, if you're going to solve for the CyberScape, the engineering folks and the planning folks have to understand that, which means you have to characterize the amount of MIPs that sit at network edges, access and egress, and your network has to be a reflection of that.

Thank you.

## DAY THREE: (MORNING): SEPTEMBER 15

## SESSION V

## "The Emerging Market Telecom Investment Opportunities"

**Presenters:**

**Miguel Horta e Costa**
**W. Gerald Gminski**
**Tim Nulty**

## Miguel Horta e Costa, Vice Chairman, Portugal Telecom, Portugal

Thank you, Blake.

I would like to begin to say how delighted I am to attend Intelevent once more. It has been almost eighteen years that I have been attending Intelevent. This time, I have something special. For the first time in my life, I won a golf prize. It was a very special prize: The best-dressed golfer. The only doubt I have been carrying these last days is that after this I should send the bill to British Airways for my lost luggage.

Well, thank you very much. The theme is a very interesting one and I am delighted to share our views in investing in opportunities in emerging markets. Portugal Telecom has been developing a policy of searching for growth. This policy naturally contemplates investment, investment opportunities in emerging markets.

My presentation will be structured around three messages: Firstly, the fact that forces at work in the telecom industry are creating new opportunities and driving incumbents to shift investment priorities to ensure the required growth .... Secondly, that leading telcos are investing strongly in emerging markets, driven by its high attractiveness and recently liberalized economic setting, resulting in a focused and international industry structure. And finally, I would like to take the opportunity to talk about our internalization strategy and its bid to become an important player in the global telecom scene. To fulfill this crucial objective, the group has leveraged on strong cultural affinities and sound strategic partnerships that will permit the establishment of successful and secure investments in emerging markets. Let us look at each one of these points in turn.

Starting with the growing forces at work in the telecom industry, we can identify three major and separate affects: The liberalization of local markets, the growing relevance of new technologies, and the changing customer demands. As the result of these every growing pressures on the telecom scene, we observe a globalization of the market, which is reflected in the emergence of global players in increased and focused competition in the development of new areas of business and geographic opportunities. In this context, incumbents must develop a clear strategy to take advantage of the

emerging opportunities while coping with the existent threats determined by a changing industry structure. The opportunities arise from new technologies and markets that may constitute highly effective economic ventures. Conversely, the growing competitive environment, the emergence of focused and more flexible competitors, and the fact that customers become more demanding constitute important challenges to incumbents. We can therefore conclude that incumbents need to restructure their business model to adapt to a competitive and uncertain environment. Their major concerns must be, on the one hand, to grow earnings and gain scale, resulting in improved efficiency, increase in market power and effectiveness to potential partners, and, on the other hand, to disaggregate and increase focus of the existing organization, thus reducing management complexity, enhancing the ability to attract skills and top talent, and increasing transparency to capital markets. In this regard, incumbents need to exploit very unique assets and positions to aspire to greatness. In fact, incumbents are often the leaders in market capitalization, generate high cash flows that can be used to exploit new opportunities, have privileged access to a broad domestic customer base, and are well positioned to take advantage of the unique investment and partnership opportunities created by the global industry influx.

To be successful in creating grow opportunities, incumbents will have to manage a multitude of initiatives across different time horizons. In fact, to develop a balanced portfolio that ensure future value creation, incumbents must extend and protect profit generators in horizon one, that is the current [unintelligible] businesses with limited growth potential, while simultaneously build horizon two businesses that will become the drivers of medium term profit growth, while also in horizon three secure viable options with high growth potential that insure the companies long term future.

These growth initiatives imply a major shift in investment priorities. In fact, the traditional investment priorities for an incumbent teleco were mainly centered on horizon one: businesses such as fixed telephony and data communications. However, a winning teleco of the future is required to expand and focus its investment priorities in horizons two and three, opportunities such as those can be found in new markets, new technologies, or new products. As a result, is a switch to an evolution of incumbents from a national and integrated service perspective to an international presents and focus, particularly toward emerging markets, requiring and resulting into a

different cultural mindset for incumbents increasing focused on high risk, high return investments.

Let us now address the specific issue of telecom investment in emerging markets. Emerging markets display unique characteristics that justify being considered a highly investment opportunity. Specifically, one can distinguish two main characteristics: Firstly, emerging economies usually display an infant telecommunications industry with low penetration of communication technology and reduced skill and knowledge base, mostly the result of an underdeveloped economy and the forbidding regulatory and monopolistic environment. Secondly, they evidence high growth potential with a huge percentage of the market unexplored, moderate and growing levels of GNP, and very high growth rate in almost all telecom businesses. These previous assertions are clearly understood if one observes a few indicators from a selection of developing economies in comparison to the United States and Portugal. These selected countries with an average GNP per capita well below the United States or even Portuguese figures—I think our figures are a bit lower, we must be around fourteen now—display very low penetration values for fixed and mobile telephony, coupled with very high growth rates for these same technologies. However, local regulation and public policy have a major impact in the global attractiveness of investment. As all of you will surely agree, the extent of the governmental invention and policies has a considerable impact on the final configuration of market. A credible investment option for a teleco must therefore be assessed along two different dimensions. Incumbents must consider, not only the investment attractiveness in terms increased growth potential, but also how favorable the regulatory environment is to new entrants in terms of economic incentives, number of licenses awarded, and so forth.

This reasoning is clearly exemplified by past experiences in two potentially very attractive markets where government intervention has distinct consequences altogether. In the case of the Philippines, government has a clear agenda to rapidly promote a competitive market while protecting as much as possible the local incumbents. The entrants policies were consistently lacking [unintelligible] over agencies of licenses, [unintelligible] call rates, and [unintelligible] connection rates with incumbents. As a result, the Philippines have proved a less attractive market for new entrants. As to Brazil, one can observe a different track record. The prime objective of the Brazilian government was essentially firstly to increase the quality of the communications network; secondly, maintain

affordable prices to the consumers, and finally, guarantee attractive investment opportunities for new players and [unintelligible] government participation for a good price. *** A carefully thought-out aggregation of existing incumbents into economically attractive holdings and the issuances of a limited number of licenses. As a result the existing Brazilian telecom sector has been considerably a highly disputed and attractive emerging market. Additionally, incumbents must capitalize on their unique applicable assists to set up lasting and successful investment in new geographic markets. New players must essentially capitalize on cultural affinities with local markets to facilitate necessary relationships and the reasonable understanding of the client demands, opportunities to add value, high financial muscle for additional investments, and potential synergies with home markets allowing for skill and knowledge transfer. Moreover, and very important to guarantee the success of international ventures, incumbents should consider the establishment of favorable partnerships that will reinforce their strategic positioning, capitalizing on a broader base of financial and knowledge resources. The principal virtues related to alignments such as the examples shown are essentially greater flexibility in terms of global reach, possibilities to specialize in specific business areas, and possibility to hedge risk with investing partners. As a result, we are moving in a path towards a new industry structure, in fact one no longer looks at industry structure where players are immediately integrated national, regardless of their size and business focus, but rather at an industry structure dominated by a few large players with presences in several internal markets.

Finally, let us take a look at how investments in emerging markets have played a significant role in Portugal Telecom growth strategy and aspiration to become an important player in the global telecom scene. To achieve growth, Portugal Telecom has forged four clear strategic guidelines to capture opportunities in emerging markets. These guidelines contribute to defining where to invest, that is in which markets and in which technologies, depending on the intrinsic economic attractiveness and relative PT's core strength, and how to invest, that is with which partners. Concurrently and in line with aspiration of being an international telecom player, PT defines as a strategic objective that by the year 2002, twenty to twenty-five percent of revenues should originate from international based ventures.

In what concerns the decision on where to invest, the selection of Brazil and Morocco as priority targets for group PT was the result of a careful

evaluation process, which took two types of factors into consideration. On the one had, the advantages specific to PT, such as the deep knowledge of these market characteristics, the group's capability of adding value, and the potential synergies between the domestic market and these chosen international markets. On the other hand, the intrinsic attractiveness of these markets evaluated according to their business volume and potential growth and profitability.

As to the selection of investment partners, PT has successfully positioned itself in a joint and [unintelligible] participation with strategic allies. It was necessary to build these alignments with high value-added third parties to capitalize on their international experiences, business know how, and financial capabilities. The alliance with these winning institutions as already translated itself into several markets, such as Brazil and Morocco, always in a concerted way. As a result, in Brazil PT is set to play an important role in the industry, as well as holding important management positions avoiding participation that imply possible holdings of minority [unintelligible] positions. In this context, PT initially bid for direct acquisition of CRT, a company established in state of Rio Grand de Sol, the communication platform with other countries as America de Sol. Subsequently, PT lead another highly successful joint acquisition in the auction of [unintelligible] System, acquiring management control positions in the fixed and mobile operators of San Palo, which account for over two-thirds of the telegraph system's income. Recently, Portugal Telecom has entered Morocco's telecom market, which displays high attractiveness, as it is one of the three African countries with an important income per capita and with the penetration of cellular phones around .5 percent. The winning alliance with Telefonica, where Portugal Telecom holds the management control position, obtains a license to constitute the second cellular operator in that country. The fulfillment of the PT international investment ventures has also implied that to ensure successful development the business it has to capitalize on its high level of know how and its experience in the home market. That is the case for the investment in Brazil and in Morocco, where PT can apply considerable know how and experience from its cellular business in Portugal. In fact, the Portuguese market of cellular telephony has been undergoing unprecedented growth, thus proving that the group is able to deal with environments with high growth potential. Additionally, the group has the capability to innovate as show by the introduction of the prepaid segment [unintelligible] card, which clearly changed the cellular market worldwide and forced that already high speed of growth in this market. And lastly, the

group managed to achieve and keep leadership in the Portuguese cellular market facing strong competition. The third cellular operator into the market left one year ago.
Concluding, I would like to emphasize how the successful development of Portugal Telecom internationalization strategy will contribute to the fulfillment of group's growth aspiration and reinforce its bid to be important global player in the telecom scene. As the result of all the above, the group is extremely optimistic about its future. We have a plan; we have a project for continued growth that is based on a successful track record and portfolio of concrete new initiatives.

Thank you very much.

## W. Gerald Gminski, Executive Director, WestLB Panmure Ltd., Media, Communications, and Entertainment Industry Group, United Kingdom

First I want to tell an emerging market story that's quite old. Twenty years ago I bought a house in Connecticut. It was owned by a man who was then quite old. His name was Fred Lack. He had been with AT&T and worked for Theodore Vale. Actually British by birth, but went to Harvard and stayed in the United States. After World War I, he was seconded* to France to help rebuild the telephone system. He came back to New York after this was done and he went up to Mr. Vale and he said, Mr. Vale I'd like to do something else. What do you have that's interesting? Theodore Vale received a direct communication from a Chinese warlord in Central China. This was at the time of the development of wireless radiotelephony. And somehow this Chinese warlord had heard about this, somehow found out how to get to Theodore Vale, and sent him this inquiry. Now the only reason this came up is when I went into this house for the first time, this man had a magnificent collection of Chinese antiques. There were these two magnificent chests on the wall. They were about seven or eight feet high and they were chained to the wall. They had some value. And went on to tell this story. This warlord in China had two territories in the middle of another warlord. He was unable to communicate between his two territories. When he put down copper either the people, as they still do today, would cut the copper and steal it and sell it or the enemy, if you will war lord in the middle, was more likely to cut off his communications. Well he'd heard this. He's obviously a smart man, so Vale asked Mr. Fred Lack, who had been a director of Western Electric, had been with Bell Labs, he was seconded to the US Government to develop radar [unintelligible]. He was given this job, so the [unintelligible words] they got it on a ship and they went to China—he and his wife and young family. And when they got this stuff off the boat, they literally had to ferry it across rivers. They had to raft it. They rolled a lot of it on bamboo up mountains to get this thing installed, so this warlord could have his communications. And when I think of this story, and I tell it often, in a sense in emerging markets, not a lot has changed from that time. China was a certainly an emerging market by definition. But a lot of the challenges we've all faced in these markets seem rolling equipment up a hill in trying to accomplish our goals. Anyway, under the title of this session: "Emerging Market Telecom Investment.

[*Second (s -k nd') is a British word meaning to transfer temporarily.]

Opportunities" are four bullet points, so allow me to summarize my comments:

**Are their still good investment opportunities out there?* Yes.

**Have the investment shifted?* Yes.

**The role of national public policy and privatization cross subsidy schemes.* I'm not current on these things, so I really won't comment.

**Business line vs. regional targeting strategies.* Here I will say that it's important to define regional or country preferences first and then define business lines as circumstances indicate.

Being an investment banker, I have to give a very short commercial. As Blake noted, I'm with the media and communications investment banking group at WestLB Panmure in London. I specialize in providing investment banking services to the telecommunications industry, primarily in Western Europe. WestLB Panmure is the investment banking arm of WestLB Group or Westdeutsche Landesbank, you may know it by that name, a large regional commercial bank that's headquartered in Düsseldorf, Germany. I didn't mean to be glib about the four bullets points above, but indeed in view of the investor sophistication of this assembly and the massive amount of information that's available on emerging markets around the world, I didn't think there was too much I could add.

Another little vignette here: On Sunday my wife and I took our children to Penzer's Place, which is a magnificent castle in Kent and where we live. There's a great playground there for the children and we're sitting there watching the kids and a woman comes up to us who is an attorney, my wife's also an attorney; this woman comes she specializes in telecom emerging markets, as does her husband. We looked at each other—oh, hi, where's Richard? Well, Richard's on his way to Prague to give a speech on Tuesday on telecommunications privatization in emerging markets. And Pam [Jerry's wife] looked at Jean and said oh, Jerry's going to Edinburgh on Wednesday to do the same thing. And they simultaneously looked at each other and said what more do they have to say? Now not to be negative or whatever, but this subject does get beaten to death. So what I want to do is

the following: I'm going to give you what sound like conclusions, and their general in scope, but they reflect my own experience. There are a couple of things I want to do. And one is my own experience in Eastern Europe, which is a little different. I did it from the inside. I was always inside an entity in the country. I didn't work for a foreign company—technically I did, but I had clients who were inside the client, if you will. I haven't been involved in emerging markets for the last couple of years, but in 1992 to 1993, I was a senior advisor to the Czech Ministry of Privatization. I biessed all the final terms and conditions of sales of strategic stakes of Czech companies to foreign buyers. So I had a good sense of how that worked. That was quite interesting. As a result of it, I was asked to go to Poland and bring a team of ten investment bankers to prepare one of the Polish banks for privatization. Again, I was inside the bank trying to be of help to get them ready for privatization. Ultimately, it took them six years. And from 1994 to 1997, I was president and chief executive officer of a Russian bank in Moscow. I was asked to go the first state turn-around of what had been a disastrous joint venture between very prestigious Western financial institutions and ten of the most powerful oligarchs in Russia. I say this, because I think of Ron when I think of this. I started in Prague were we made up the rules as we went along, because it was so early there were no rules. We started with rotary phone and a little typewriter that didn't work. Well, a year later we were filling dozens of companies a month and fully up to date in terms of technology. But it was like starting in little league. Ron was a little league coach in the United States in baseball; when you start in little league you play, you learn the game. I was moved then to Warsaw. Warsaw was kind of the minor leagues—bigger country, different problems, different culture, and I learned a lot more about post-Communist transition economies. And then I finally went to the big leagues. I went to Moscow where everything was head to head, toe to toe. These were the people who actually wrote the rules of the game.

I'm not an expert on the rest of the world other than Eastern Europe, and I'm really no longer one. I used to consider myself more than reasonably knowledgeable. But I have my own opinions. I'm also not a portfolio trader. That's not my game. And I don't discuss these matters in that vein. It's more for people who are doing direct investment and for corporates primarily.

I want to comment a little bit though on that. We look at those markets. When Prague, if you will, when the Czechs decided to put their voucher

system in place, what they did was created something like twelve hundred companies that had tradable stocks, but they had no liquidity. The Poles, again everything was different, created a stock exchange where people had to file documentation and they had to show progress so people could essentially some kind of fundamental research on them. Well there, they had not enough stocks trading and massive liquidity, so values shot up because there were only a few stocks to trade. In Moscow, we've seen the worst of all this. You probably know that only ten million dollars a day of Russian stocks are traded. There are a number of people in this room who actually move the Russian market on a daily basis by a substantial margin. So I don't try to discuss those markets. I think they are something of a mystery to me.

What I would say first of all is that I am optimistic on telecom investments worldwide. Most investment bankers are pie-eyed optimists or they wouldn't do what they do. But it's based on something that I think is real: The substantial progress made in the 1990s by many emerging market countries and the skills and knowledge the investors have gained during this period. I think a lot of people who worked in emerging markets or have worked or have lived in these places complain that these things don't work, they're corrupt, the phone systems isn't good, or whatever it is it isn't right. We have to stop and think how far these people come. If you go from 1939 really to 1989, that's the era these countries were under duress--some of them more so than others. We were talking earlier, I was talking with Bruno, the Czechs have a very peculiar view and I know there's a number of people here who have worked for them, but if you realize that their government was actually run by the secret police, you'd understand that they do look at things a lot differently than people who had even more normal Communist governments, if you will, in other parts of Eastern Europe for the former Soviet Union.

There's another reason for my optimism, and again, these are general comments. There are two rules I was told long time ago by a man who had been involved in strategic planning at AT&T. One involves local service, let's not call it telephony, but communications, and that was, I guess this goes back to the period of Theodore Vale: You put a telephone in front of somebody, they will use it. And I think that applies everywhere. It doesn't need to be a telephone, it can be an Internet connection, it can be a satellite connection, VSAT, it doesn't matter. People will use it if it's provided to them. And I think this is very important as it pertains, not only to developed

countries, but to those that we're talking about in this session. Secondly, there's another line I learned, and actually it's the result of Ron Coleman, that I think applies to this whole matter of bandwidth worldwide, but it also applies to things going on in countries like those in Eastern Europe having to do with, let's call it for a better term, long distance: Don't count the number of people who use the bridge by the number of people who swim the river. This seems to be a very simple way to understand what's going on in our world today—a very advanced world of communications and other technologies—but also it will ultimately happen in these countries who are looking to be more like us.

There are good telecom investment opportunities out there, but only because there is a better infrastructure in the upgraded network through which endless enhanced services and products can be introduced. The opportunities exist because over the past decade improvements in government infrastructure, the judiciary bodies, commercial codes, electricity grids, country debt ratings, the lowering of inflation, employment rates, among other developments have made these environments much more user friendly from an investment point of view. Now they may still not be perfect, but they are a lot better than when I moved into Prague and our group was assumed to be working for Western investors, because we were Western. It was a tough time. People were very unsophisticated. We were the enemy still. Things have changed a great deal since then.

Progress has enabled investing companies and entrepreneurs to better define what the opportunities are and countries have become facile and sophisticated in identifying, valuing, and selling their assets. I come a long way and negotiated a lot of transactions on behalf of the Czechs. People were trying to negotiate the wrong things: Like how can we protect ourselves if the Communists are going to come back into power. Well the Communists never left, so that made no sense at all. Or if the Russian Federation—it was just about the Russian Federation by then—is going to reemerge, become powerful, and take back Eastern Europe. Well as we've seen since then, the Russian Federation, for all its strength and so forth, has a very difficult time dealing with the likes of Chechnya and other things, so none of this was very likely. But most importantly, the thing that's changed, from my viewpoint, are attitudes. I think in very walk of life, in business, personal attitudes, professional attitudes, corporate attitudes are very, very important. [Tape ends; new tape begins.]

I can see a lot of people having trouble in Poland; a fair amount of trouble in the Czech Republic, maybe less so in Hungry, but all of this is in degrees.

Eastern Europe in particular again, I think there are other countries that work the same way, are great examples of what's happening next door? Next door, somebody privatized their telephone company or has some new competitive telephone companies in place and some of their regions are being expanded. There's a great case about [unintelligible] in Poland. I'm not sure this is actually true; it may be apocryphal. [Unintelligible] is convinced the reason why Silesia has so few telephones is that the Russians didn't want that particular part of Poland to have telephones, because Silesia had a long history of being secessionist. So now, if you will, there's more talk than movement about fixing that situation. It's entirely possible that other countries looking at that [will say] well we can do the same thing. We can take an area that's relatively empty and do something about it. But I think what I really me here in this "next door" syndrome is sort of "keeping up with the Joneses." The various countries that want to join the EU are perfect examples. Now Hungry, Poland, Czech Republic, and some others, certainly they should let in the likes of Slovenia from my standpoint. Actually from my standpoint, they ought to let everybody in. But in the Baltics, they want to have the same growth, they want to have the same facilities, they want to look as good in the eyes of the world as the guy next door. And that has a lot to do with things getting done. I think, I know we had a representative here Slovakia. I think Slovakia is a very good example—a couple of false starts, but it has always looked at the Czech's as having done better than they did. I think at least some of the progress that has taken place in Slovakia is that there is legitimate interest in making things work better and that requires being more user friendly with foreign investors.

My thesis is good opportunities and successful ventures depend not entirely on investors' ideas, money, technology, hard work, or expertise. To a great extent receptive business environments and cooperative infrastructure are very important keys to success.

Investment criteria have shifted as evidenced by the expanding list of players who show up to bid on telecom investment opportunities in emerging markets. I will just use one example. The best one, I think, is Vodafone Airtouch, both of which had very high levels of criteria about the places they wanted to invest. Their very GDP oriented. They did show up to bid on

some Eastern European licenses, but now they've become active in Africa and things like that. So things have changed. But it's not necessarily the decision to go into that country. It may be other things that are at work. One thing Tim brought up is the matter of money. I think there's more money sloshing around the world today *** for investments. This is what's keeping stock markets high, bond markets relatively stable, and people constantly looking for new places to put their money. It's not so much that somebody's decided that emerging market telecom deals are a good idea, it's just an awful lot of money being pushed and it has to be pushed into something. And certainly a good piece of that's going to go into telecom, which most people think they understand. Everybody knows how to use a telephone.

I think there are some other ones. Spheres of influence are very important. The Scandinavians for instance have taken on the Baltics as a sphere of influence. I think that helps in this process. I'm using again Eastern Europe. Mr. [Gerhard] Schroder [Chancellor of Germany] just within the last week or two defined Poland as within its sphere of influence. But the German community has been in Poland and the Czech Republic and Hungry for a long time doing deals. It's nothing new. But it add an imprimatur to places like this and I think in other parts of the world that works in the same way.

I think the other thing is by now countries have shown their stripes. I think those that are receptive and live by the rules will attract more money and will attract more companies that want to work there. And those who have not, the bad boys, will be ignored. And there are lots of examples of that. By the way, in terms of how Russia fits into all this, I would say about Russia [that] I had a great time. I learned a lot, but I would never do it again. [Russia] is a problem that's going to take some much longer to cure than those countries like [those in] Eastern Europe and other parts of the world that have some background in democracy that watch how the rest of the world has worked. Russia is going to take, we all think, at lot longer. Although two of the largest opportunities in the world are sitting there right in front of us and all of us are thinking, my god, Russia is in great disarray and we're not going to touch those things with a ten-foot pole. I do believe that for the large operators there two things just sitting there waiting.

As I said earlier, I'm not up to date on national public policy and privatization cross-subsidy schemes, so I'm not really going to comment. But I will say that without the aggressive nature of some privatizing

countries and the level of eagerness with which bidders showed up for deals in the early 1990s, other more conservative countries, again in Eastern Europe, that stubbornly resisted reforms and privatization, would not have progressed as far as they have if their inhabitants in government hadn't seen the progress made by their neighbors. I think Romania and Bulgaria are examples of this. Slovakia is an example of this. On the matter of policies, again something I'm not up to date on, but when we got to Prague, Vaclav Klaus, much maligned by his own population sometimes, but he said three things, which by and large, they've—this is one thing were the policy has helped—he said we're going to do three things: We're going to honor our debts. They've done that. He said we're going to contain inflation as best we can. And over the last couple of years they've had more trouble on economic basis than they did earlier. And the third thing he said [was] we're going to privatize the country as fast as possible, so the other guys can't take it back. And I think that was a national policy that has helped. I think it may not have been done as well as everyone would have liked, but I think it certainly helped the national basis.

All of this boils down to an evaluation of risk. And all of us out here I think have different views on this. And after all I'm just, as you will, a naive investment banker who really never gets into quite the detail that you do when you make a decision to invest in any country. And so many comments, as I said, are a little broader.

I thank you for being here today.

## Tim Nulty, Deputy Chief Financial Officer, Department of Energy, USA

Thank you, Blake. I really quite awe struck by the number of die-hards who stuck through to this end. I wish I could promise you the same entertainment value that the fiddler and the fireworks provided last night, but I can't do that in all humility. But I'll do my best, and I'm sure the rest of the panel will as well.

I'm going to focus on the first of the four questions that were raised by the topic set out for this panel, which is are there still good investment opportunities in emerging markets? The question obviously implies a perception that there are not still good opportunities available and that something has change. There used to be good ones and they're all gone now—or something like that. And to answer a thing like that I think it requires a bit of history and unfortunately I'm long in the tooth and so history is my failing. I'm going to speak from the experience of about fifteen years both as a participant and an observer of Western industrialized investment in emerging market telecom. I'm not going to address the question of the Department of Energy's telecom, in fact it was a request in the permission my boss, Secretary of Energy, Bill Richardson, gave for me to come here, that I not speak about the Department of Energy—so forgive me Blake.

The history goes like this. I first entered the emerging market telecom field fifteen years ago when I joined the World Bank as a senior task manager/ lending officer. Fifteen years does not seem like much—certainly not for somebody who's approaching the age of sixty. But fifteen years ago, if you think about it, this world absolutely a different place. A topic of this sort in a form like this fifteen years ago was unimaginable. There was, in fact, no industrialized country investment, certainly no private investment, in emerging market telecoms. I should apologize. In the old days we said underdeveloped countries, then it became PC [politically correct] to say less developed countries, then it was PC to say the third world, and now we say emerging markets. If I loosely interchange these through the speech, forgive me. I mean them all to be the same.

The only investment—or virtually the only investment—done from a hard currency investment from the industrialized world was from institutions like

the World Bank, Asian Development Bank, InterAmerican Bank, European Investment Bank, and so forth—the IFI. We did vast majority of this and speeches like this, in forms like this, by people like me consisted of please to people like you to come and invest in the emerging market telecom and we were mostly met with, at best, skepticism and, at worst and very commonly, with stony silence. This was nonsense, it wouldn't work, and it was impossible. Shortly thereafter, however, by the late eighties, that environment had changed and a considerable amount of investor interest in such investments had emerged, partly because of the history of what had happened in the developed telecom markets, with the divesture of the Bell system, the privatization of BT, and so forth. There was a perception among incumbent operators in the West that (a) that sat on a lot of cash and cash cows in their existing networks, but that these networks were not good investment opportunities in the long haul and that they were saturated and that for high growth you were going to have to go abroad into relatively underdeveloped markets and get your growth by building copper at a high rate, a much higher rate than you could build at home. There was a lot of cash and a lot of major incumbents looking around for investments and they found to their dismay that were no—or very few—suitable vehicles. The problem at that time was not that there wasn't a demand or need for the investment in the recipient countries, clearly there was, and there was a demand for places to place their money by the potential investors, investing community—there wasn't a vehicle or their weren't suitable vehicles or enough vehicles. That situation changed largely because of those two pressures and it changed in the form of the first tier or the first phase of privatizations of the emerging market PTTs, followed very quickly by the licensing of major mobile companies.

I'll have to pause and tell an amusing story, because there are a couple of friends in the audience who remember this. One of the instruments forcing this change, by no means the only one, but one was in fact the policy pressure from the IFI. As a manager of about a billion dollars of the World Bank's money, all of the loans that I instituted or that I negotiated had covenants in them that liberalization had to take place as a covenant of the loan. Typically you had two instruments: You had a loan with the PTT, which was covenanted to undertake institutional changes internally that made privatization possible—accounting and so forth, valuation items, and then you had a guarantee, because all World Bank loans are guaranteed by the government. The guarantee agreement with government, which mandated changing the telecom law to permit competition and openness,

mandated the privatization or partial privatization of the PTT as part of the loan. And these are loans the represented a significant amount of the entire indebtedness, the entire debt obligation, repayment obligation of many countries, so these were not trivial instruments and not trivial pressure. And nevertheless we were pushing in the direction of history, if we were pushing against history, it would be different. We were pushing in the direction of history. And then the irony was here we have a covenant that says you have to start a process of privatizing your company or PTT and start a process of changing your legislation and the government finally says OK we'll do this now. What do you want us to do first? So well the first thing you should do is hire a first-class financial advisor to help you with this process. And so they say fine OK and they go out and do their thing and hire JP Morgan or Goldman Sachs or Rothschild's or whoever and we say very good, very good and these chaps come in the first thing they say is we'll stop all this competition, open liberalization stuff, because we can sell a monopoly for a hire price and get a better fee if we don't do any of that—so stop! So we had delicious irony of being in a certain friendly opposition with our very creation. So beware what you've wrought.

Anyway that process went through; we're all aware of it. Most countries have privatized or partially privatized their PTT. Most have gone through an initial process of liberalization. Most have licensed—almost all have licensed—several if not more mobiles. A very substantial amount of the initial pressure by the initial players for outlets for investment was satisfied. And a great deal of investment was absorbed. And most of the big players, who were in the first tier, got a piece of the action somewhere. They competed in various places, some lost, some won, but most people got a piece of the action somewhere. By the mid-nineties that game had more or less run its course and people were busy doing their work.

We then went into a lull, something of a lull, not least because of the hiccup in performance of the emerging market economies, the Asian crises, last year, most recently, the collapse of the Russian financial system, and so forth. And now finally, recently, I'd say in the last six months or so, with the rebound of the stock markets and the resurgence of confidence in the world economy and the world financial system, there is a new surge, a new growth of interest and demand for places to invest in, in the emerging markets. It comes from two places: As before, there's a great deal of new money. They're typically financial investors and operators, and both of these a bit different than in the first tier. On the financial side, a very large

amount of money—I wish I had figures on this, but couldn't find a place to find them—a very large amount of money has been raised for funds of various sorts: Emerging market this or East European that or Asian infrastructure or whatever. Some closed end, some open end, all different sorts, but a lot of money in the hands of financial investors looking to buy assets. The second group are operators, but a new kind of operator, many of whom we have heard from in this conference: the WinStars, the Completels, the PetraNets, the Global Crossings, people of this sort that didn't exist five years ago and if they did there were struggling to just break out of the egg and now they are becoming serious players and seriously pushing into emerging markets and saying what can I do and where extend my network and so forth. These are new players. And just like before, and it's a reprise of history, and it was the point of all this; just like before, there remains a very substantial demand for investment in the emerging markets. It's changed. A lot infrastructure has been built, but demand has accelerated far more than the infrastructure.

I'll give you an example. When I first came into this business, we still did business—this is only 1985—we did business by telex. We really did business by telex. Believe that or not—not so long ago. And just before I came over here, I had dinner with some old friends who are neighbors. The woman about fifteen years ago turned a hobby—she's an enthusiast for beads, all kinds of beads, she makes necklaces and jewelry and so forth and this was a hobby and about ten years ago or fifteen years ago she decided to quit her job a make a business of this. Anybody who's from the Washington area knows the business: it's called Bedazzled. It's very successful and she's got four, five, six stores around the area and doing very nicely, very nicely indeed. I asked here how's the business going? We hadn't seen her in about a year. And she said well the business is going great on the revenue end, but really beginning to get killed on the margins. And I said why is that? And she said, well, you know my real capital was many, many years of finding sources. So she all these little sources of little people in remote corners of India and Peru and in Ukraine and so forth, which make beads and supply her. And she said, you know, it was good margin. I bought them cheap and sold them expensive. Now, these folks are going on the Internet. They're going on the Internet in tiny, little India villages, which ten years ago didn't have a telephone, didn't even imagine they would ever have a telephone and yet today somehow or other they banded together and got hold of a computer and they get on the Internet and they find out what she's selling her beads for and what they're getting—and they find other people

who are bead sellers, so they're getting a bigger piece of the action. Now that's really happening. And it's happening in remote places. I mean this is not in New Delhi we're talking about. These are real odd corners of the world. So the demand has grown. Absolutely! Demand is still there. Infrastructure's grown. Demand's grown further. Demand is there. And there's more and more demand for places to put the investment, but as before lack of vehicles. How do it do it? I want to spend some money. What can I buy? I'm an investor. What can I buy? Feelings that the vehicles aren't there and they really aren't in the sense that people are looking for them. The first tier is gone. And if you weren't a France Telecom or a TIW or one of the big early players, it's hard to get a piece of that action. Second tier players in the emerging markets: very few of them. The nature of the emerging markets telecom sectors was such until very few years ago totally dominated by the monopoly carrier and then a little bit layers the monopoly carrier and a couple of mobiles. No space for second level operators. So if you go looking for somebody to invest in who's got five years of experience, solid track record, good management, licenses are all in order, good balance sheet, hasn't had to go raise money from the Mafia or anything like that—simple clean company, you won't find any or very, very few. And if you do find one, there are fifty people at the door banging on the door to buy them, which means, of course, the price is high and no matter how good the company is if the price is too high, you can't make money. The opportunities, the vehicles for this kind of investment are not there at the level that people are looking for or they're not there in sufficient quantities.

Many of the investment opportunities, by the nature of the history, nature of the market are in start-ups. That's doubly the case now that the emphasis and the real business are beginning to shift not to infrastructure per se, but to the marketing package of services and so forth. A point Bruno had made earlier and will probably make again. That even more biases the investment opportunity space to the start-ups. However, it's the nature of the people who are looking, not the institutionally tuned to look at or to develop start-up opportunities. Why? Funds are looking to buy existing assets and they typically have transaction floors—five million, won't do a deal less than five million, ten million. These are common numbers, some as high a twenty-five. Well, of you're precluded from placing less than five million dollars at a go, you're precluded from start-ups. You're even precluded from deals that might be perfectly capable of absorbing fifty million or a five-year period, but they can't take it now. You just swamp the canoe; they'll just

steal the money if you put that much money into a start-up to early. So there's institutionally precluded from mining the gold where it is instead of where they're institutionally inclined to go. The other kind of investor, which are operators, have in some cases a similar in affect, but slightly different in nature, institutional barrier. First, the largest—those who go looking for portfolio investments, to buy a local company, to buy access to this market or that market—have exactly the same the same problem the financial investors have. There aren't many. But the typical new guys, they're not really going, they're not really looking to buy somebody, they have a business plan, a good business plan. They believe in it. It's worked back home. And what they want to do is extend that business plan into country X. They want to go build what they know how to build and sell what they know how to sell. And that's fine, but it's not about start-up in that country. It's about going into the new country, hiring locals to do my business plan. It's not about finding somebody who's got an idea and finding his business plan. It's not to say it's bad. It's good. You're doing what your good at. But it does mean that about bunch of opportunities are not addressed and are missed because of the nature of the kind of institutional investment inclination.

Now, start-up opportunities, I say which are where I think not by no means all and this is not a pitch that start-ups are the exclusive Valhalla. They're simply one part of investment space that up to now has been neglected. In fact, in fifteen years of in same cases being forced to go look at start-ups as an investment opportunity, not because I really wanted to—I had the same institutional constraints and biases that everybody else had, but because I had to—discovered that in fact in many business than the mid-level. Why? Because mid-level companies in emerging markets typically are flawed. And the biggest risks you face when you buy a mid-level company in an emerging market is not the market, not the basic economics, it's the mistakes that were made in an earlier faze in the company's history. It's problems with the way the articles of corporation are set up. They have a difficult partner and you can't deal with them, they've got special voting rights or some things wrong with the license or they took on debt from places that are difficult to deal with and have problem, etcetera, etcetera, etcetera. Most of the problems, most of the risks are not with the basic business. It's fixing the mistakes that were made before. Where if you go in, in the beginning, you don't have that problem. You fix the mistakes in the beginning. You fix the mistakes early. And furthermore, if fail to fix the mistakes and you can't fix them, you're only out five hundred thousand dollars, not out five or

ten million dollars. So the fundamental risk profile is actually much better for the start-up than it is for the later one in these markets. On top of that, of course, is when you come into a mid-level, because it's a seller's market at moment, you're paying a premium for the privilege of buying something that's got a lot of problems. And so you have much greater risk and lower upside. When you buy cheap at the beginning, you don't have that problem. You've got all the upside, you build in the founder's prices so if the company makes it and if it's capable of moving to the next level and absorbing five, ten, fifteen, twenty million dollars, you've already built in your own prices, your founder prices. You not only get a good company; you get it cheap. The economics are very strong. Why are they there? It's demand and supply. These opportunities have not been sought and not been pursued. If there's a flood of venture capitalists that go running around looking for this stuff, then it will dry up. But right now, it's not—it's not dried up. The gold nuggets are still lying around on the ground. We haven't got to the shovel stage.

What I'm arguing for—it's not as simple as all that, although it's not to actually realize these things. It's not rocket science. By and large, it's simply hard work; it's Small Business 101. We teach it to undergraduates in business school. You don't need an MBA for this. It's mainly hard work and keeping the accounting straight and so forth. But there are a couple of rules that I think are important to keep in mind. And there simple rules—it's not rocket science—but they are important rules.

One is that value is built during the operation, not by the transaction. Transaction-oriented investors will miss where you build the real value. What you pay for the company in the beginning doesn't matter that much: A hundred thousand dollars or two hundred thousand dollars really doesn't matter that much. What matters is that you get a good structure, you get control so that during the next eighteen months or two years, you can hire the managers, you control the corporate documents, you control the debt structure, you put in the accounting system, all of that sort of thing--much more than the transaction. The value is built by the management activity and oversight during the subsequent period.

Second piece: these are fundamentally entrepreneurial activities, so you have to create a structure which permits both your target entrepreneur, the company you're buying into or creating, and what ever little structure you build in your own company to oversee this activity should be separate from

the rest of your business and should be structured with the degree of independence and the kind of incentives that support entrepreneurial activities. This is not simply a matter of having a subdivision of your business development department get this brief and say well go be entrepreneur. It doesn't work quite like that. You have to create something that's purpose-built for this activity.

And finally, and this is perhaps the hardest lesson that I personally learned, is that the financial discipline you impose on such activity has to be, if anything, even greater than what you do on the rest of your business. The tendency for venture capital in general, and certainly venture capital that's done by institutions that are not fundamentally venture capitalists, the strong tendency to excuse loss leaders—to say well you know we'll get around to the revenues after we've built the network and so forth. I'm a very hard liner on this business. I do not believe in loss leaders! Every investment that I was ever in charge of was required to be cash positive within eighteen months or the first dollar, and furthermore, that the investment--and the accounting to be set up to track this--so that a block of investment which occurs in the year of 1998 is profitable in 1999. Now if you at a fast growing company and investment is running ahead of that, the total company may not be cash positive, but that's not an excuse for saying that every single block as you go along has to pay its way. In any given moment, the philosophy was that at any given moment if the air supply is cut off, this boat floats on its own. At any moment, it can float on its own. That kind of discipline, even if it sometimes imposes a restriction on maximum growth that you might not wish to see, that is absolutely fundamental to keep the entrepreneurs on track. Entrepreneurs will tend to wander off into visions and visions don't make money.

The second thing you need as part of the discipline is a very clear timetable. My personal preference: Got to be cash-positive in eighteen months from the first dollar and every block of investment have to profitable the next year. But in addition to that, you need a clear timetable for decision-making. My personal opinion is that you have basically two phases in these kinds of things. The first phase is when you invest a small amount money to buy in to see whether it's good. It buys you the right to name the management and do all the structural things. And there's the period where decide whether you like what you got—and it shouldn't be long, eighteen months. OK it's in place; we like it; we'll do the next tranche* of serious money or we won't and you should make that decision is eighteen months. The second phase

[*Tranche is a French word meaning slice.]
you should have a decision, you should have a clear idea what you're going to do with the company, disposal absolute max three years to four years. And the disposal options are (a) we shut it down. Bag it. Second option, you sell it to somebody else. Third option, you incorporate it. It was such a great idea you make it part of your company. Fourth option, you decide to partner with it. You sell part of it, you make it a subsidiary, and you partner with it. And those decisions should be made max three to four years and all the entrepreneurs involved targeted and your own should know they've got to meet that deadline. They've got to make the company "decisionable," "investable" to the parent by then.

I'm told the time. Conclusion: There are indeed, in my view, lots of opportunities, really lots of opportunities in the emerging market, but they're not always where you're looking. It's a bit like fur traders in the mid-nineteenth century. There weren't many beaver left in the Rockies, but there sure was a lot of gold. And there is a lot. I leave you with another axiom or saying that I learned from my mother, believe it or not, which is don't be a buyer and in a sellers market and if beef is scarce and packing houses are overpriced, open a feedlot and start fatting cows.

Thank you very much.

# DAY THREE (AFTERNOON): SEPTEMBER 15

## LUNCHEON AND KEYNOTE PRESENTATION

## DANIEL C. PETRI
## (Substituting for Frederic J. Salerno)

## Daniel C. Petri, President, Bell Atlantic International, U.S.A

**(Substituting for Frederic V. Salerno, Senior Executive Vice President & Chief Financial Officer, Bell Atlantic, U.S.A.)**

As you can see from the program, the scheduled closing speaker is Fred Salerno. Fred is Senior Executive Vice President and CFO of Bell Atlantic; [he is] also a good friend of mine and my boss. Unfortunately, Fred, about midnight last night, reached the conclusion that he would not be able to join us today. The reason is as part of his duties as CFO he is affectionately referred to as Bell Atlantic's chief dealmaker. And he is up to his eyeballs in Vodafone negotiations right now. When I spoke with him yesterday morning, he fully expected to that would be buttoned-up and even announced by this time today. In fact, he was looking forward to making this the site of the European announcement of transaction between Vodafone and Bell Atlantic. Unfortunately, they got caught up in the details late last night and it is not done yet. Not ready to be announced. Therefore, Fred couldn't leave his post back in New York. He sends his apologies, his regrets, his greetings, and he also sent me his speech. So what I would propose to do is to use some part of what Fred had planned to convey to this group. And what I want to try to do is put it in the context of what we've been discussing over last three days, because I think the opportunity we have here to take a step back from the things we've learned from each other since Monday morning, think about how they apply to, in this case a regional Bell operating company, and take notice of the kinds of things Bell Atlantic is doing in response to those factors.

So let's start by remembering that during the past few days there's been a lot of talk about the rapid changes we're seeing in our industry in terms of what is means for networks, for fixed lines, for wireless, for global economy, the dot com economy, e-commerce—we've all had some version of the "e" in many of the presentations we've seen. And one symbol of all those changes is the millennium, the change over to the year 2000 at the end of this year. We recently came across or saw published an article in the New York newspaper about the nation's excitement over the century that is just ahead. I would like to read just one passage from that:

> The consensus of those we interviewed on the streets of Manhattan is that we will welcome the new century with open arms, but don't expect us not to be a little frightened. [Unintelligible] is changing. Work is changing. Science is advancing. The world's political climate is unlike anything we've every witnessed. Even the weather seems different. Many see the party coming to an end. Others see a dawn of even greater opportunity.

Now if that quote sounds familiar, you're a lot older than you look, because it is from December 1899. But it really doesn't matter if you think about the things that were described in that quote. Change always brings about some degree of uncertainty, discomfort, and it also sets the change for opportunity.

As Charles Ecesley, the former chairman of NCR once said: "I been the business for thirty-five years, I've learned a lot, and most of it doesn't apply anymore." I think we all share that view one time or another and I think for a former Bell operating company, one time when the feeling was particularly strong was in 1995 just before the U.S. Congress passed a telecom act, which was designed to open markets and create competition in the telecom arena.

I'd like to tell you about the game plan that Bell Atlantic put in place at that time—1995—to meet the demands of what we thought we understood to be a new environment. But first I'd like to discuss the current environment and how it's driving the need for a new infrastructure, new product set, and change in our capital structure.

We've spent three days discussing change and I think you'd all agree that we find ourselves at cross roads that consist of changes in economic, political, and technological trends that are all influencing the future. But we think we've got it figured out. We think that the bottom line result of all those changes for our business is that our business is simply all about making connections and that means making them both quickly and quick—referring to the speed that we've talked about—as well as easy and reliable. And that is a reoccurring theme of everything we've done for the last three days. The biggest challenge for Bell Atlantic, especially for any incumbent provider, is to upgrade and expand an existing infrastructure to meet those challenges. It's not the same as being able to come in and build new, because we find ourselves for better or for worse the owners of some existing infrastructure.

The communication infrastructures of the future must have enough capacity, enough speed, and enough accessibility to support some four trillion e-mail message a year. We've talked about the growth in e-commerce, so I won't go into that part of it. One thing that we found we needed to support the infrastructure changes was a change in our capital structure and we've done some things about it. Before Bell Atlantic and NYNEX merged in 1997, the earnings per share growth in both companies was about eight to ten percent. We have not in a long time achieved a double-digit growth rate in earnings. Today, the growth rate of Bell Atlantic post-NYNEX merger is ten to twelve percent consistently, quarter after quarter, and after we complete the GTE merger, which we expect in the first quarter of next year, we expect growth and earnings to move to thirteen to fifteen percent in first two years and then to exceed fifteen percent by the third year. At the same time since 1995, our cash flow has grown by more than thirty percent. Today we generate earnings before interest, taxes, depreciation, and amortization of about fifteen billion dollars. After the GTE merger early next year, that fifteen billion will become twenty-seven billion. Now in both cases the ramp-up in cash flow and earnings is due to continued growth in our business and merger synergies. Now think—we've been talking about huge companies obviously—but think about the Bell Atlantic NYNEX merger two years ago, 1.8 billion dollars saved annually as a result of synergies between the two companies. And expect over four billion annually in synergies from the merger of Bell Atlantic and GTE. So that kind of cash flow and that kind of savings gives us a tremendous amount of fire power when it comes to investing in the future of the company. So when hear about the mega mergers—certainly we all think about scale and scope and brand all that stuff—but lurking under all of those public faces of the benefits of a merger are things that have to do with higher, higher cash flow and they position the companies to do the kinds of things they need to do with their infrastructure. We believe if they stayed the way they were, they wouldn't have the capability, the financial capability, to make those improvements. So as the result of being strong in terms of capital structure we are increasing capital spending. And more important than just increasing it, we are focusing it so that we can seize the market opportunities that we see in the future. For example, in 1999 about sixty percent of our capital spending will be in four areas of growth: DSL service, providing high-speed, always-on Internet access; the data network for business customers; digital wireless CDMA expansion and preparation for 3G technology and wireless; and deploying more and more fiber optic cable for SDH compatibility. So we see those opportunities—and those are things that five or ten years ago were very

small. In fact even as recently as 1995, only twenty-five percent our spending was dedicated to those areas. Today it's over sixty percent. By the way, our capital spending level is about eight billion dollars a year. So we're talking about all the equipment suppliers out here, we're a significant amount of cash flow for you too and that's part of what's fueling the technological advance.

We are internally funding this growth as the result of the cash flow that I mentioned earlier. And in addition, for both mergers, Bell Atlantic did not pay a premium, so we're able to enter the benefits of these mergers without paying a premium which is critical for a company like Bell Atlantic whose stock continues to trade at a discount to the overall market and as we believe undeservedly at a discount to our peer group. But that's improving as investors start to realize the benefits of what we're doing.

When we make these growth investments in the infrastructure, we've got targeted three growth areas in terms of customer demand: global data, wireless, and broadband access to the home. Now, we've touched on all of these the last three days, so I won't spend a lot of time talking about them, except to say that with respect to global data, we're building a 600 million dollar fast packet network and that only can take care of Bell Atlantic in its existing footprint, because we're not able to spend money outside of our footprint until we get long distance relief. That doesn't mean we don't take care of our customers when they leave the footprint, in fact for large business customers, who need data services in various places, we end up establishing partnerships with companies who can bring those services to the customers. So we're frustrated by the regulatory challenges, but that doesn't mean we're unable to meet customer demands in this regard, it just means that we have to do it a different way. So I think given what we've talked about in terms of data growth that's what we need to cover on that subject.

As far as wireless is concerned, Bell Atlantic today has about ten million wireless customers, including three million internationally owned customers and the base is growing at thirty-five percent a year. That's a ten million dollar base growing at thirty-five percent a year. It's a tremendous growth rate.

Let me say just a few words about what we're trying to accomplish with Vodafone. The hope for joint venture between Bell Atlantic and Vodafone in the US will create the largest US wireless carrier and about the fourth

largest world-wide carrier in terms of number of wireless customers. In fact, when we include the GTE wireless base of customers along with Bell Atlantic and Vodafone, that will bring us to some twenty-three million subscribers in the US and world-wide. And the new company will have coverage over ninety percent of the US population. So as we continue to see more penetration of wireless services throughout the US, we'll have an opportunity to capture some significant share of ninety percent of the population of the US. That will solidify certainly our competitive position and give us the ability to offer bundles of minutes at flat rate, coast-to-coast. So within the US, a lot of confusing things we have today with respect to wireless service can be blown away if you have a full service, coast-to-coast provider. And that's what we intend to be.

In terms of broadband, again we've talked about the fact that only five percent of online users today have access to broadband and broadband when if finally reaches those customers will give them capacity, speed, and always-on access. Bell Atlantic is using what I would characterize as a evolutionary approach to broadband. We find ourselves, not surprisingly, the owners of tremendous amounts of copper in the feeder and the distribution plant, certainly heavily copper in the distribution, moving rapidly, but not a hundred percent yet, to fiber in the feeder plant. So fortunately for us, efforts to develop the DSL product have born fruit in the last few years, which was novel, we expected it to happen six years ago, but it has turned around. And as a result of that, copper, as somebody said during the last three days, we can turn copper into gold as a result of applying the DSL technology to existing copper. So we find DSL to be exactly we're looking for as a mechanism to bring broadband to the home, broadband to the businesses that are still served by copper.

We've committed four hundred million dollars to DSL deployment over the next few years. Our goal is to be in 1000 central offices, which is about two-thirds of them, passing ten million households of the first quarter of 2000.

From a financial perspective, DSL has another advantage and you can think of it a just-in-time capital deployment. All we need to do is equip the central office for DSL and then each individual line as the customers buy it. You don't have to equip all of the outside plant and then hope people will buy it. So it provides for more efficient use of capital.

Now, we talked about DSL a few times during this week and a number of people who are customers of Bell Atlantic pointed out to me that DSL is not available in their areas yet. We have few thousand customers and I don't know why I didn't get any of them to come here. Next time I will. But we are working our way through a deployment plan that started just a few months ago when we completed our equipment selection and it is underway and will hit ten million households by six months from now. So be ready when it gets there and be first on the list.

I think I'll interject here another Petre Opinion. I don't think DSL is the permanent answer to broadband to the home. It's a great use of the existing copper that's in the ground for incumbent carriers like ourselves, but if we were starting from scratch, we might not choose that technology. When there's enough demand, enough applications to really chew up the bandwidth that can be delivered by other means, I think we'll see a pretty rapid migration to something else. You can take your pick about what the something else might be. But I would say that after we get every line we have equipped, I don't think we'd want to equip new construction with copper and planning to put DSL in it. I think we'd want to jump ahead and do the same kinds of things that our new competitors are able to do, which is use whatever the latest thing is.

A word also along those lines about regulation: For broadband to flourish as effectively as wireless has, we have to have the regulatory framework worldwide that operates much like framework for wireless. In wireless, there are essentially is not a strong regulatory control. Government agencies don't set prices, limit profits, or otherwise regulate commerce in the wireless world in the US. Through a spectrum auction, barriers to entry are eliminated and capacity is expanded and as a result you see the tremendous expansion in wireless usage that we have today. Wherever regulation is necessary, you find that industry players negotiate agreements. For example, we're involved in working with all of the major wireless carriers in the US to set a standard for 3G protocol. My hope is that would be expanded through worldwide negotiations so we can finally travel around the world with just one set. It's underway.

However, in the broadband world, unlike wireless, there's lack of certainty and lack of parity for all the companies that are interested in investing capital in the broadband markets. The former Bell companies are required by regulation to provide equal access to their data networks. We have to let

anyone who wants to connect, either on the customer side or on the provider side, with the existing data network. The cable TV industry, on the other hand, is expanding its existing closed system into the Internet world of cable modems and they have no obligation to allow others to interconnect with their systems.

The Internet, as we've said in the past few days, has thrived on a basis of open access and diversity of content, and yet the home access is a bifurcated arrangement. The cable TV industry is able, without any obligations to allow others to interconnect, to expand into that business, whereas our network, by law, has to be open. So we understand why, certainly the cable companies, let's say like AT&T, would want it that way. After all when open access was something we were threatened with, we didn't like that too much either. But we're past the point of no return with respect to open networks and we see the future and we see how we can fit in, in an open architecture. We would like to see all of the industry competitors in that regard faced with that same challenge and opportunity.

I said, at the beginning of my talk, I wanted to spend a few minutes on 1995 and the goal we set for ourselves when the Telecommunications Act of 1996 was being put together. We identified four strategic moves that we felt were necessary to prepare ourselves for this growing competition. I would like to identify those four moves and then gives us a little report card on where we stand. And again, this comes under the heading of the general, sort of theoretical discussions that we've had during the week and applying them to a real world telecom situation—in this case Bell Atlantic.

The four strategic moves were number one, this was for NYNEX, but could equally be said for Bell Atlantic in its original configuration. The first the need for a horizontal merger to solidify our US position—become a bigger, stronger footprint. The second was a vertical and national play to add new capabilities to our range of services. The third was to gain a national wireless footprint to take advantage of scale and scope in an exploding market. The fourth was to form an international partnership. Now let's review the progress.

Horizontal expansion was completed with the Bell Atlantic NYNEX merger in 1997. This merger reunited, going by to the old Bell system days, reunited the lucrative East Coast, including the Boston, New York, Washington corridor. We established a strong foothold with forty-two

million access lines, twenty-two million households, thirty percent of the national data market, and a twenty billion dollar long distance market. So that's in place.
Item two was the vertical national play. That's nearly completed. That is the Bell Atlantic GTE merger. As I said, we expect that to close in the first quarter of next year. What that does for us is bring together some complimentary access, both nationally and internationally. For example, GTE has specialized in Latin and South America. NYNEX Bell Atlantic has specialized in Europe and Asia. We put those pieces together and there aren't too many part of the world one or the other company hasn't covered. GTE also has a state of the art national data network and just think of the potential of putting the customers in the Bell Atlantic footprint on an already existing national data network that comes under the same umbrella when Bell Atlantic and GTE merge. So that merger solidifies our horizontal and vertical positions in the US.

Taking wireless separately then is the third goal. We have developed a certain degree of national reach. We just added four hundred thousand lines in upstate New York purchased from Frontier. We've got Primco, our PCS provider. When you combine with GTE, which has recently acquired some Ameritech cellular properties, we find ourselves to be one of the largest US wireless companies. Now, as I said before, Bell Atlantic, GTE, Vodafone in the US we hope coming together to form the largest cellular carrier in the United States. So that plan is well underway and significant portions of it are in place already.

And finally the fourth item: forming an international partnership. I would have to say that that's a work in progress. With GTE, we'll have mixture of mature and start-up companies in some twenty-six countries. What's important to us, however, is being able to terminate traffic for the customers in our footprint. If you go back five years and look at the Bell Atlantic international strategy and the GTE international strategy, you can see that they were defined by taking an interest in local exchange companies somewhere else in the world. In other words, taking the core competencies that were established in the home base, exporting them to high growth areas around the world. That's how we ended up in Thailand, for example. That strategy has served us well, but it doesn't fit today's world as well as a different strategy would fit. And the different strategy now going forward will be defined by a concept to taking our customers wherever they want to go. So if you have a large financial customer based on Wall Street in New

York, they have offices in Paris, Tokyo, and Hong Kong. We want to be able to give them seamless connectivity from one location to the next just as some of the other companies in this room do. And that is what will drive our international partnerships, investments, and relationships going forward. It will be somewhat of a change of what we've done in the past. So that whole international partnership work continues to be a work in progress.

Now stepping back once again from the things that we've done and the things we have under way, what strikes me is that it's not just the economy or just the telephony that going global, it's actually in a certain sense our lives. There was an article in the Scientific American in June of this year in which they said "for the first time in history millions of people have virtually instant access from their homes and offices to creative output of a significant and growing fraction of the planet's population." We've talked a lot about convergence the last few days, but it was always in a technological sense. Think about what quote really means. We're talking about convergence of human and network intelligence coming together in a way so that various elements of the world's population can communicate with each other and learn from each other. No matter what piece of the industry we're in, we're all a part of that. At Bell Atlantic, what we're trying to do is make sure we identify what that trend means in terms of convergence and then provide the things that can enable our customers to take advantage of it.

That's my summary of the Bell Atlantic story. Thank you.